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The Journal of Obstetrics and Gynæcology of the British Empire

VOL 31. No. 2 (New Series). SUMMER, 1924

ON THE IMPLANTATION OF THE HUMAN OVUM AND THE EARLY DEVELOPMENT OF THE TROPHOBLAST.

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On the Implantation of the Human Ovum and the Early Development of the Trophoblast.

By John H. Teacher, M.A., M.D. (Glas.),

St. Mungo (Notman) Professor of Pathology in the University of Glasgow, and Pathologist to Glasgow Royal Infirmary.

Introduction.

The process by which the human ovum becomes enclosed within the decidua is still uncertain. William Hunter recognized that the membrane to which he gave the name decidua was the endometrium modified to serve the needs of pregnancy.

How the decidua reflexa came to envelope the ovum he confessed he did not know, and he left on record no theory. This defect in his last work was supplied by printing as his the views of his brother.

These were founded on John Hunter's theory of the nature of inflammation and healing of wounds, and, while in gross they were erroneous, they have their place in the present day conception of the nature of the implantation of the ovum which he compared to the encapsulation of a foreign body in the tissues.

The idea that the mammalian ovum attains its access to the stores of nutriment borne in the maternal circulation by destruction of maternal tissue, which is followed by reaction on the part of the maternal organism, is now based upon many studies of human and comparative embryology. In 1899 the monograph of Hubert Peters gathered all the available data together.[1]

The famous Peters' ovum, although only about two millimetres in diameter, was already embedded in a little swelling of the decidua. There was a gap in the roof of the decidual cavity about eight-tenths of a millimetre in diameter, which was closed by a mushroom-like mass of fibrin and blood-clot involving some of the outer cells of the ovum.

This suggested a process of implantation like that of the ovum of the hedgehog, as described by Hubrecht in 1889. The works of Hensen and V. Spee on the embedding of the ovum of the guinea-

1. The position at 1903 was summarized fully by the writer in his work on Chorionepithelioma. The fullest account in English of the literature and position up to 1910 is that of Keibel and Grosser in Keibel and Mall's Embryology, and Johnstone's memoir of 1914 and Strachan's recent review in this Journal are well worthy of study.

pig showed a different mode of implantation. But these two modes are in essential correspondence, inasmuch as there is destruction of the maternal tissue by the ovum itself, and the definitive connexion is effected by means of a great proliferation of the outer layer of the ovum (called trophoblast by Hubrecht, ectoplacenta by Duval). This unites with the reacting maternal tissues and opens the maternal vessels in such a way that a circulation of maternal blood becomes established in it, and later the development of a fœtal circulation completes the placenta.

The theory of Peters that the human ovum implants itself in the decidua and that the gap over it is closed by a coagulum (Gewebspilz of Peters) still prevails, although it has been criticized. Several apparently normal ova, nearly as young, showed no "*closing coagulum*" (Bonnet's name for the Gewebspilz), but what they did show could well be derived from it. In 1908 the writer and Professor T. H. Bryce in collaboration described the ovum T.B.1, younger than that of Peters, in which instead of the wide gap there was only a little circular aperture about one-eighth of a millimetre in diameter. The lips of the aperture were thick and composed of living decidua like the rest of the roof of the cavity. The aperture was occupied by a little mass of what was regarded as fibrin and leucocytes. We held that this ovum revealed the real aperture of entrance and that the wide gap and closing coagulum of the Peters' ovum were secondary and due to the destructive action of the trophoblast on the roof of the cavity.

Between 1908 and 1922 much new material had become available, a number of valuable ova had been very fully worked up and the problems had been discussed by many writers. We, therefore, felt that the time was ripe for a fresh review of the "Imbedding and early development of the human ovum." Then, in June 1923, Professor Teacher discovered a new ovum a little larger than that of Peters and excellently preserved. In the present memoir the writer takes as his province the implantation of the ovum and the development of the trophoblast, and in a contemporary memoir Professor Bryce deals with the embryo proper and the mesoderm.

There are now in existence at least six ova younger than that of Peters, viz., "Miller," "Kleinhans," "Teacher-Bryce," Von Mollendorff's "Sch.," "Leopold (1906)" and "Linzenmeier." The first two of these are certainly younger than "Teacher-Bryce."

It cannot be denied that any or all of these ova may be pathological, but all of them are valuable. Used as a series of specimens the facts which they reveal, in spite of some apparent contradictions, go far towards the construction of a normal line of development in the period which they cover.

On resuming critical study of the Teacher-Bryce ovum, the

authors were delighted to find that they had in no way exaggerated the beauty and clearness of the specimen. Considering "its adventures," as Johnstone tactfully puts it, the preservation is wonderful. Compared with other young ova it is good, and in the light of our fuller knowledge to-day, the writer and Professor Bryce are more confident than before that it is normal. It is still a unique specimen, although "Sch." of Von Mollendorff is very like it in some respects. The central subject, therefore, of the present communication is the original Teacher-Bryce ovum ("T.B.1.").

The new ovum, which we have called Teacher-Bryce No. 2 (T.B.2.) shows more clearly than any previously described specimen adhesion of the blastocyst to the roof of the cavity of the decidua at the aperture of entrance and the filling of the aperture by an outgrowth of primitive ectoderm. A similar structure was described by Herzog (1909) and by Linzenmeier (1914) without recognition of its special significance, but in 1916 Schlagenhaufer and Verocay identified it as a mechanism by which the last entering parts of the ovum itself close the aperture by which it entered the decidua. Before the writer was aware of the work of these authors he had already arrived at the same conclusion. He believes that their interpretation is absolutely sound, and congratulates them on having solved an important problem of the relations between the ovum and the mother. For this apparatus, which they called the Verschluss ("lock," "seal" or "plug"), I suggest the name "Operculum Deciduæ."

Attention may be drawn here to the illustrations from the pencil of Mr. A. K. Maxwell. These are the most faithful interpretations of the microscopic pictures and represent the finer histological details more accurately than any photograph which I have been able to produce.

Part I. The Closure of the Decidua Capsularis (Reflexa).

Description of the Teacher-Bryce Ovum No. 2.

It has seemed to the writer best to approach the subject by a description of the new ovum as it belongs to a group in which there is a considerable number of well described specimens, and regarding the main features of which there is now comparatively little difference of opinion.

The new ovum, although considerably larger than that of Peters, presents a very close resemblance to it in many particulars. The villi are longer and the intervillous space is, therefore, more developed. The characters of the trophoblast are practically identical in the two specimens. The most striking points of difference are the extent to which traces of a necrotic or at least

degenerate layer of the decidua are recognizable in places almost all round the new ovum and the presence of the structure at the aperture of entrance referred to above.

The closing cap (" Gewebspilz " or " Schluss-coagulum ") of the Peters ovum is absent, but there is one little pear-shaped clot on the surface of the decidua which is very suggestive as to the origin of that structure. It lies close to the aperture of entrance overlapping the operculum, measures 0.36 mm. in length, and seems to have arisen as the result of hæmorrhage from the implantation cavity through the thin degenerate roof. (Compare Fig. 2, Pl. 2 and Text Fig. 1 on p. 174.)

History of Ovum T.B. 2. It was found at autopsy at Glasgow Royal Infirmary on the 12th June, 1923.

History. P.M. No. 10902, June 12th, 1923, M. S., 36 years of age, was taken ill with severe pains in the joints on the evening of Thursday, 7th June, 1923. In the evening of the following day she was admitted to the Royal Infirmary as a case of acute articular rheumatism and was at once put on sodium salicylate and sodium bicarbonate. The joint condition subsided rapidly and on the third day she complained of slight buzzing in the ears. The salicylate treatment was, therefore, discontinued. On the evening of Sunday the 10th she became very ill with air hunger, restlessness and tendency to delirium. This became very acute and violent and death took place on Monday, June 11th. There was a very bad history of alcoholism.

Data as to coitus and menstruation could not be obtained, but from the statement by the husband that he had no idea his wife was pregnant it seems reasonable to infer that there had been no missed period.

The post-mortem examination was made about 19 hours after death. The body was that of a big, stout woman. There were a few small petechial hæmorrhages into the skin. The mammæ were large but not notably pigmented. The joints were not swollen. There was practically no sign of post-mortem change. The organs generally were those of a healthy subject but showed considerable cloudy swelling and fatty degeneration and many small hæmorrhages. The liver was of distinctly alcoholic type. The uterus was slightly enlarged, and on examining the appendages a large corpus luteum was found in the left ovary.[1]

The uterus was then removed with great care and opened up the middle of the anterior aspect. On cutting through the muscle it was recognized that there was a thick congested decidua. This was opened carefully and on drawing the two portions of the anterior wall apart, characteristic decidua was seen covering the posterior wall. Near the fundus and to the left of the middle line there was a small thickening of the decidua, the right margin of which overhung a deep furrow. In this thickening a clear spot was recognized indicating the presence of a very small ovum. There was

1. The ovaries of all women of child-bearing age ought to be examined for the presence of corpora lutea before the body of the uterus is touched. The uterus should not be grasped but should be steadied by the broad ligament during removal.

a sort of halo of radially arranged blood vessels around the clear spot. The appearances suggested an ovum about 4 mm. in diameter—a good guess. The uterus and appendages were immediately placed in Kaiserling's formalin and salts solution.

Head. There was marked congestion of the membranes and substance of the brain and some chronic thickening of the pia arachnoid. Portions of liver and kidney were preserved in order to obtain some estimate of the degree of post-mortem change which was present.

After 30 hours in Kaiserling the uterus was well washed in water and transferred to alcohol. Next day the colour had come up very well, and Mr. A. K. Maxwell made the picture of the whole uterus and appendages, Plate 1, Fig. 1, after which the portion of decidua containing the ovum was cut out by Dr. Teacher. An oblong about 1 cm. in length was taken and the knife was passed under the ovum so as to take a very thin layer of uterine muscle along with the decidua. The block of tissue included the whole of the swelling and the furrow. Plate 2, Fig. 2, was painted by Mr. Maxwell at a magnification of almost exactly 16 when the specimen was in absolute alcohol. During the clearing in xylol, the red marks on the surface of the lobule appeared distinctly as blood vessels arranged around the lighter area which corresponds to the situation of the blastocyst. Text Fig. 1 shows this in a camera lucida drawing originally at X 40. The paraffin block was cut by Dr. Teacher and the sections mounted in a practically perfect series by Mr. N. H. W. McLaren of the Anatomy Department. The cutting was done with an old-fashioned Cambridge Rocking Microtome, and the thickness of the section is 6.25 microns, that is 160 sections to the millimetre. Most of the sections were stained with hæmalum and eosin. Iron hæmatoxylin, Carmalum and Gram's stain, Pappenheim, van Gieson and Leishman's stain were also tried.

Description of the Ovum. On examining the decidua with a hand lens a slight depression was recognized which was taken to be the point of entrance. At the side of this depression furthest from the furrow there was a tiny blood-clot, referred to above, which became an important landmark.

During the cutting of the sections an air-bell was found in the ovum. From various considerations it was made out that this must have got in after the fixation. It has caused tearing of part of the blastocyst wall from the blood-clot in the intervillous space beside the operculum, but it does not interfere with the interpretation of the specimen (see Pl. 3). The series starts at the furrow and traverses the block in what was the sagittal plane of the uterus. The point of entrance was found to lie nearer the furrow and lower margin of the lobule than the centre of the ovum. This eccentric position is quite usual. The ovum was measured in Slide No. 36, which was approximately the equator. Over the ends of the villi its diameter is about 3.75 mm., and including the trophoblast about 4.5 mm. The blastocyst itself measures 2.6 mm. in the sagittal plane by 2.25 mm. in depth and 2.8 mm. in the third diameter calculating from the number of the sections in which the

blastocyst appeared. The ovum is, therefore, slightly larger than that of Jung and von Spee's 1905 ovum, but slightly smaller than that of Strahl-Beneke.

The blastocyst is roughly globular in shape, but shows slight irregularities. It has a large cavity, at the borders of which there is a thin layer of mesoderm, except in the neighbourhood of the embryonic rudiment where there is a considerable thickening. The cavity has contained a richly albuminous fluid, the more solid parts of which had settled towards the deep side corresponding to the dorsal decubitus of the body. Coagulation apparently took place after settling had occurred, and as a result of these two processes the rudiment was torn at the junction of the vesicles. Nevertheless, a very successful reconstruction was made by Bryce and McLaren. The embryo resembles closely that of Strahl and Beneke, but is distinctly younger. It is situated towards one side of the blastocyst and runs aslant along the wall of that cavity next the decidua basalis and is attached at the distant ends of amnio-embryonic sac and yolk-sac.

The blastocyst is covered with short villi some of which show the commencement of branching. The intervillous space is full of blood which is well preserved. The cytotrophoblast extends between the tips of the villi forming a thick and fairly complete shell practically all round the ovum. There has been considerable congestion which has caused a certain amount of breaking up of the trophoblast and infiltration of blood between the cells. In places, however, notably in the neighbourhood of the point of entrance, the trophoblast shell is practically undamaged. This breaking up by the blood brings into prominence the polyhedral shape of the cells of the cytotrophoblast. At many points the trophoblast and the decidua come into intimate union, so that it is impossible to distinguish exactly where the one ends and the other begins, but over large areas of the periphery the two structures are delimited from one another by a zone of degeneration or actual necrosis of the maternal tissue. It may be said, therefore, that there is a transition zone (Umlagerungszone), as in Peters' ovum, but likewise there is in places a necrotic layer as in T.B.1. Fig. 3, 4 and 14. The principal feature of the decidua is the great development of the glands. The decidua cells are distinctly less advanced than around T.B.1.

At many points blood vessels open into the implantation cavity. As a general rule the agent which opened them appears to be a mass or masses of the primitive syncytium (plasmoditrophoblast). The blood vessels are of capillary size and run round the periphery of the ovum. As a consequence they usually appear as slit-like cavities lined by trophoblast on the ovum side and by endothelium

on the decidual side, and they open obliquely into the cavity. Vessels of larger size have usually undergone thrombosis of their contents, but this condition is not peculiar to the neighbourhood of the ovum. It is seen throughout the decidua. Figs. 3, 12, 13 and 15.

The trophoblast differs strikingly in its character on the wall of the blastocyst and stems of the villi and at the ends of the latter. In the former situation it consists of the usual two layers. The inner (the cytotrophoblast representing the future layer of Langhans or "cell layer") consists of protoplasm with very little indication of differentiation into individual cells. The nuclei are placed at very regular intervals and are of globular form. The second layer (plasmoditrophoblast or syncytium), definitely syncytial in character, forms a thin border in some places so delicate as to resemble endothelium. Nuclei in this syncytial layer are mostly of elongated form and lie parallel to the surface. They are of much larger size than those of the endothelium of maternal vessels and confusion between the two structures is practically impossible. There is no sharp demarcation of the two layers from one another. The appearance in this respect differs very strikingly from what is seen in the fully developed chorionic epithelium of even very slightly later stages. Figs. 6, 13 and 14.

At the ends of the villi the cytotrophoblast spreads out into masses of polyhedral cells which are considerably larger than those of the inner layer on the stem of the villus and are well defined from one another. In a villus cut lengthwise the syncytium (plasmoditrophoblast) ends a little beyond the tip of the villus leaving the cytotrophoblast uncovered, and the latter fuses with that of neighbouring villi forming a complex structure tunnelled here and there by passages for the maternal blood. The walls of the passages thus may consist not of syncytium but of slightly flattened cytotrophoblast cells. This direct apposition between the cytotrophoblast and the maternal blood was observed by Peters, and can be quite clearly recognized in some of his figures.

The appearances generally may be interpreted in the sense that at this stage of development the two layers have become well differentiated although not sharply demarcated. We are inclined to believe that they both increase by independent proliferation. At the same time further formation of syncytium from the inner layer cannot be excluded.[1] It is clear from T.B. 1 that they both arise from the ectoderm, the undifferentiated cytotrophoblast of that stage being the mother-layer of both.

Karyokinetic figures were recognized in the cytotrophoblast

1. In this connexion the beautiful illustrations of Delporte should be studied.

but were not numerous. On the whole, despite the damage by congestion, the trophoblast and neighbouring maternal tissues are excellently preserved, and the whole object is exceedingly beautiful.

In all respects the villi and trophoblast present a close resemblance to those of the very well preserved ovum of Jung.

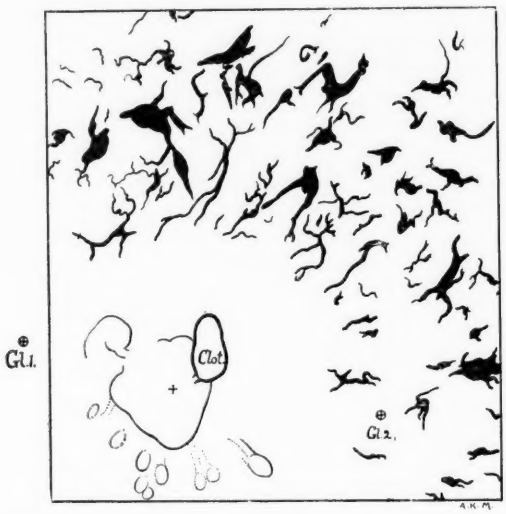
The ovum, compared with other specimens of a similar stage of development can be described as deeply implanted; that is to say, that the lobule in which it is embedded did not project much above the level of the surrounding decidua, and the lateral walls of the cavity are composed of thick, well-preserved maternal tissue. The implantation cavity occupies the compact layer and pushes down into the spongy layer. The decidua, as usual, is thinner on the top than at the sides. A considerable central, rather irregular, area of the roof of the implantation cavity is necrotic, while a wider area round that presents signs of degeneration.

The thin roof corresponds to the flat-looking surface shown in Fig. 2. The extent of the avascular degenerate decidua is fairly accurately shown by text Fig 1. Some capillaries extend further towards the centre than the blood-vessels which are represented, but only for a very short distance. In section 28.2.2 (corresponding to the cross marking the centre of the aperture) the avascular area is about 2.5 mm. and the dead area about 1.5 mm. in diameter.

The sides of the lobule are covered with uterine epithelium which becomes more and more flattened towards the top. It has disappeared from much of the degenerated area, but even where the epithelium itself has disappeared there is a continuous lamella consisting of the basement membrane, and on this there are traces of epithelium often associated with leucocytes and thin fibrinous exudate. As the point of entrance is approached this lamella becomes separated from the decidua by the outlying processes of the operculum. Figs. 5, 6, and 10. Practically throughout the area of the roof, except just under the aperture of entrance, the implantation cavity is lined by a necrotic layer similar to that bounding the implantation cavity of T.B.1. It is composed partly of dead decidua and partly of fibrin. Immediately internal to this in places there are mononuclear cells with deeply-staining protoplasm and slightly shrivelled appearance, which are decidua cells that have been loosened from the necrotic zone by a process of lysis or digestion of the dead tissue. Leucocytes are present in large numbers.

In places, notably near the point of entrance, there are masses of rather lumpy fibrin with entangled leucocytes. This does not give the characteristic staining reaction of fibrin, but its nature is quite clear, transition stages from it to characteristic fibrin network being readily recognizable. Masses of the primitive syncytium are

seen here and there, sometimes apparently eroding the necrotic zone. In other parts the cytotrophoblast is seen in intimate union with the necrotic layer. The general picture, apart from the peculiarity of the point of entrance, is very like what is seen (unfortunately under a very low magnification) in the beautiful photograph by Schmorl of the whole section of the Strahl-Beneke ovum.



Text Fig. 1.

The aperture of entrance and the Operculum Deciduæ. The accompanying line figure gives the key to the description. The small, heavily outlined area is the blood-clot which is seen in Fig. 2. The heart-shaped area, which it overlaps, was seen as a white figure during the clearing of the specimen, and microscopic investigation proved that it is the apex of the cone of blastocyst which is adherent to the decidua. The cross in this area represents, as nearly as could be determined, the centre of the operculum in section 28.2.2.

For measurement this section, which is the subject of Figs. 4 and 6, was chosen. It is difficult to recognize the limits of the aperture as the margins of it are thin and degenerate, and confusion arises between fibrin and the remains of decidua. In this there is marked contrast with the conditions in the T.B.1, in which the lips of the aperture of entrance are composed of thick, living decidua right up to the operculum nearly all round. The dimensions of the aperture of entrance, therefore, are really determined by the measurements of the narrowest part of the operculum, viz., near its base on the mesoderm. Fig. 6.

As nearly as can be determined, the real orifice in T.B.2 is roughly circular in outline, and measures about 0.3 (three-tenths) of a millimetre in diameter contrasting with that of T.B.1, which is 0.125 (one-eighth) of a millimetre in diameter. Superficially it widens out crater-wise, corresponding to the spreading of the outer parts of the operculum.

The operculum is clearly an outgrowth of the ectoderm. The wall of the blastocyst is adherent to the roof of the cavity over a roughly circular area from five- to six-tenths of a millimetre in diameter, at the margins of which it falls steeply into the implantation cavity, so that the attachment forms the flat top of a blunt conical projection of the blastocyst.

In places the ectoderm on the sloping sides of the cone has undergone slight proliferation. The characteristic chorionic epithelium becomes thicker and the nuclei become irregular in size and oval in shape, Figs. 5 and 6. At other places there is no such overgrowth. At the edges of the cone and in some places within them, the ectoderm has disappeared or become degenerate, Fig. 6, and there is union between the mesodermic wall of the blastocyst and the dead material forming the roof of the implantation cavity. The appearance suggests that degeneration overtook the two tissues together, so that they became fused with one another. At other points, however, the ectoderm is living and well preserved, and can be followed from the side of the cone round the edge and along the flat top into the structure in the centre. The continuity of the trophoblast, that is to say, of the ectoderm of the blastocyst wall with the operculum is, therefore, quite clear.

The operculum is composed of cells of irregular shape and size with rather ill-defined boundaries. Their character is best seen in a section passing somewhat to one side of the centre.

Figure 5 shows one half of the operculum in section 26.1.5. The mesoderm has retracted from the ectoderm. The cells of the operculum, which were set upon it, are large and fleshy and contain large oval nuclei. Both cells and nuclei vary much in size. This layer presents a close resemblance to the primitive cytotrophoblast of T.B. 1. The cells also resemble the elongated cells of the ectoderm of the hedgehog ovum in Hubrecht's Fig. 39, which is reproduced on Plate 14.

The outer parts of the operculum consist of long sprawling cells more like the syncytium in character. They contain large elongated nuclei and there are also a few vacuoles. The outermost strands are somewhat degenerate and there are lumps of coagulated material in the vacuoles. The large size, both of the cells and of the nuclei, is realized when they are compared with the uterine epithelium.

The uterine epithelium or its basement membrane can be traced from the sides of the lobule of decidua right to the centre of the operculum. It is seen in Figs. 5, 6, 8 and 10 as a thin, well defined lamella separated by a narrow space from the ectodermic cells of the operculum. In places it is difficult to distinguish it, and in the centre it appears as irregular lamellæ, the nature of which can only be inferred from their likeness to the basement membrane in the better preserved region. In the figures the nature of the lamella is clearly recognizable where it consists of flattened cells with oval nuclei which are exactly like the flattened cells of the epithelium on the sides of the lobule, and just where it joins the decidua three quite definite low cubical epithelial cells are seen. Fig. 10. Under these, but separated from them by a spindle-shaped decidua cell, is seen the extreme edge of the operculum in the form of a long thin cell with a long, deeply stained nucleus of large size.

From the relations between the epithelial lamella and the ectoderm, it is clear that the latter has spread out not over the surface of the decidua but into the decidua below the epithelium. This is an important observation as it provides the foundation for the theory that the last entering cells of the ovum unite with the uterine epithelium and close the breach in it in the same manner as occurs in the implantation of the ovum of the guinea-pig. See part III, section 2.

The adhesion of the blastocyst to the decidua capsularis looks quite strong at some points of its circumference, but in some sections it has the appearance of becoming loosened either by mechanical separation with formation of fibrin in the gap or by the agency of masses of syncytium growing in between it and the decidua. Fig. 9, Plate 7.

It is impossible to say whether the apex would eventually have become free or not. It does not appear to me that adhesion is necessarily pathological. In most young ova which have been described there is no such adhesion, and it seems probable that freedom of the blastocyst from the decidua capsularis is the more common result of development. It is the type which is seen in T.B. 1. and Johnstone's ovum.

The Operculum in T.B.1. At various times in studying the original Teacher-Bryce ovum we were struck by the resemblance of part of the mass in the aperture of entrance to the vacuolated syncytium of the ovum. This, in fact, had been noted when the ovum was originally described, but Bryce and I were unable to come to a decision as to its nature or significance and eventually left it unremarked. Recent examination, however, enables me to say with certainty that it is a mass of primitive ectoderm, and that it represents the structure in T.B. 2 which has just

been described. The blastocyst of T.B. 1, as can be seen in Fig. 3 of the 1908 memoir, is separated from the aperture of entrance by a thick mass of dead material, fibrinous in nature, which extends in a peculiar blunt point down into the implantation cavity. Fig. 16, Plate 10. It is dense and lumpy like slowly formed thrombus, and this suggests that it was formed from slowly circulating blood doubtless when the blastocyst was being separated from the operculum. A similar plate of fibrin is found in the corresponding position in Johnstone's ovum, and it is probably a structure which regularly forms to strengthen the decidua capsularis at and about the aperture of entrance. We will refer to it as the "internal shield" of fibrin. The character of the tissue occupying the aperture of entrance is seen in Figs. 16 and 18. It is an irregular mass of protoplasm enclosing several nuclei. There are also some vacuoles. The loose cells clinging to its outer end are rather suggestive of the remains of the uterine epithelium. The mass of protoplasm on careful examination with high powers was found to be similar to that tissue of the operculum in T.B.2, and no doubt is felt as to its nature.

After a prolonged search I found the corresponding point of the blastocyst at the place where I should have looked for it at first, viz., opposite the pointed end of the endodermic vesicle, as shown in Fig. 17, Plate 11, and text Fig. 4. It has retracted to some little distance from the aperture of entrance in an oblique direction. The photograph Fig. 17 shows a little depression in the necrotic zone which is suggestive of an inner, crater-like mouth of the aperture of entrance, but is in reality an area of solution of the internal shield by syncytium. The supposed point of attachment on the wall of the blastocyst is marked by a slight protrusion of the ectoderm, but there is no thickening. An appearance suggestive of thickening is present, but is due to the fact that the area is situated near the apex of a bulging of the blastocyst wall and has been cut somewhat obliquely. In the wax model this bulging is seen to be a fairly narrow ridge, and is so represented in the transverse section in text Fig. 4, p. 205. The only clear difference between this point and the rest of the blastocyst wall is the manner in which the syncytium leaves bare a minute area of the cytotrophoblast. Although there is so little characteristic histologically there can be little doubt, from the relations of this area, that it represents the point at which the blastocyst was attached in the aperture of entrance.

On examining all the sections in which the operculum occurred it was found to be of quite considerable dimensions. It extends through 12 sections of 7 μ thickness, and, therefore, measure 0.084 mm. in diameter. It has a flat base of roughly semi-circular shape resting on the internal shield of fibrin. Possibly it represents

only about half of the operculum, the rest having been detached and its place taken by the fibrinous exudate which occupies the rest of the aperture. Fig. 16 on Pl. 10.

Ovum of Schlagenhaufer and Verocay.

To finish the account of the operculum the ovum described by Schlagenhaufer and Verocay must be given first place. It is slightly larger than that of Peters, the blastocyst measuring 2 mm. by 1.6 mm. by 1 mm. The embryo is very similar, and the authors group their ovum with that of Peters, whereby only those of Miller and Linzenmeier are reckoned as younger, while the Teacher-Bryce ovum is cast out of the list of normal ova as " vollig pathologisch." Schlagenhaufer never did deal in half measures.

The villi are very short, and they terminate in long-drawn-out processes of trophoblast which is largely syncytial, and stretches out through a relatively large implantation cavity which is distended with blood. The ovum was obtained at the post-mortem examination of a married woman, 35 years of age, who committed suicide by swallowing lysol. Death occurred three hours later, and the examination was made 14 hours after death. The mucous membrane presented the usual thick, furrowed appearance. From the posterior wall projected a small prominent lobe about 5 mm. in diameter and of dark red colour. Fixation in 10 per cent. formalin.

The illustrations show a fine specimen, but it is quite clear that there has been enormous congestion which seems to have distended the intervillous spaces and stretched the trophoblast to an extreme degree instead of breaking it up, as occurred in T.B.2 in which the congestion was much less. One would doubt whether such long drawn out processes represent the normal picture of the trophoblast at any stage.

The authors comment that there is one feature of the ovum which stamps it as a remarkable specimen. In sections which occur towards the centre of the ovum, the blastocyst, which had been of elliptical outline, assumes the form of an amphora. This change of shape is produced through adhesion of the mesodermal and ectodermal wall to an area at the outer pole of the implantation cavity. " On both sides this—to continue comparison with the amphora—amphora-neck is bounded by the pre-villous blood spaces. One sees quite clearly that the tissue filling the narrow area has arisen from the ectoderm. The series shows that the ectoderm, which heretofore had consisted of a single layer of cells, passes over into this plug of peculiar epithelial cells which have a strange nail-like shape rising vertically [from the blastocyst wall] and without definite cell boundaries. The nuclei are mostly large and clear, the protoplasm homogeneous. A few leucocytes are

scattered about. This remarkable structure is shut off from the cavity of the uterus by a clot of fibrin, leucocytes and red blood corpuscles. It is further remarkable that in this area, which is found in 41 sections, and measures 0.328 mm. broad, 0.36 mm. long, and is about 0.2 mm. thick, there is no uterine epithelium. Also, the mesoderm takes no part in the formation of this plug of tissue." Elsewhere the "ectoblast," which apparently is here used with the meaning "cytotrophoblast," consists of a one, two or many celled layer surrounding the whole blastocyst. The discussion of this remarkable structure is worth quoting in full. "Before all must be considered the little area which stamps our ovum as remarkable. There is no doubt that we have here before us the portal of entrance of the ovum into the uterine tissue, and that here is clearly revealed to us how the aperture due to the invasion by the ovum is closed. We see clearly that the ovum itself and in special its ectoderm attends to this closure by the formation of a plug of epithelial cells. As the stopper of a bottle, as the keystone of a vault, so this outgrowth of the ectoderm closes the entrance to the implantation cavity with its precious contents, and only like the sealing wax over the cork there follows a formation of fibrin and blood clot on the surface as a sort of caulking." In a footnote the authors mention how the accidental crushing of a section by the lens showed the strength of the "Verschluss." The whole slice of ovum went to pieces and left the operculum and the process of the blastocyst together like the neck of a broken flask. The firmness of the adhesion is also shown in T.B. 2 by the way it resisted detachment by the air bell.

The authors ask why other investigators have not seen this kind of closure of the decidua; and reply that it is partly because their ova were too old, and partly because, once the ovum has sunk below the surface and become completely covered by decidua the seal or "Verschluss" is no longer necessary and disappears or becomes so much altered as to be no longer recognizable. They point out that most probably Herzog had seen the "Verschluss," but they have evidently found some difficulty in understanding Herzog who did not recognize the structure which is so clearly shown in his illustrations as the seal of the point of entrance. Herzog, on the contrary, believed that the ovum entered by quite a different channel, viz., a long tunnel which started outside the boundaries of the implantation cavity and passed along under the surface of the decidua and almost parallel to it until it reached the place where the ovum was going to settle. They also refer to the occurrence of very similar structures in the ova of Jung and Linzenmeier, and in an ovum belonging to Professor Peters which has not been published in detail. In conclusion they say, "we

might, therefore, believe that the discovery which we have set forth is not a peculiarity of our own but that this Schutz-deckel [safety cover], which the ectoderm itself prepares, is probably of normal occurrence in the development of the ovum and persists perhaps only until the ovum is entirely surrounded by blood lacunæ." This discovery is brushed aside by von Mollendorff as "etwas hypothetisch," but in our opinion, it is of the highest importance and is the solution of the problem of the closure of the decidua reflexa (capsularis). It will be referred to again under Implantation, Part III.

The Ovum of Linzenmeier. The ovum of Linzenmeier is at a stage between T.B. 1 and Peters but nearer to the latter. It is remarkable for the very small size of the blastocyst and the structure at the aperture of entrance. The measurements of the blastocyst, taken from the junctions of mesoderm and trophoblast, are practically the same as those of T.B.1, viz., 0.75 mm. × 0.615 mm. × 0.525 mm. The external measurements are about 1.05 mm. × 09 mm. It was found *in situ* in the uterus which had been excised on account of persistent metrorrhagia in a multipara. There are no accurate data as to possible age. It was fixed immediately in 10 per cent. formalin solution. The ovum was situated on the posterior wall somewhat to the left of the middle line. The endometrium was thick and showed the usual furrows. In section, there was no definite division into compact and spongy layers and there were no proper decidua cells, but the decidual reaction was distinct around some of the blood vessels. Œdema of the superficial layers was the chief feature. The glands, however, were greatly hypertrophied and were in full secretory activity. The author points out particularly that the secretion was not mucous but albuminous and apparently contained glycogen, there being much red staining with Best's glycogen stain.

The ovum was embedded in the usual somewhat prominent lobule. The epithelium is flattened over the surface of the capsularis, but is absent only from an area 0.525 mm. in diameter in which sits the "closing coagulum." This is shaped like a biconvex lens 0.225 mm. in thickness and "its edges are fitted into the opening like a lens in its mounting." The outer convexity projects above the level of the mucous membrane. Its inner surface is continuous with the trophoblast. It consists of fibrin and blood clot. "From the edges spindle-shaped and stellate cells have grown in—the beginning of organization—and the base is in part permeated by trophoblast cells." The wall of the blastocyst rises to it in a broad, flat conical projection very similar to that in the T.B.2. Linzenmeier apparently regards the closure as essentially due to the coagulum, and the relation of that structure to the wall

of the blastocyst is an interesting peculiarity which he does not attempt to interpret.

For purposes of Part II the following is noted here.

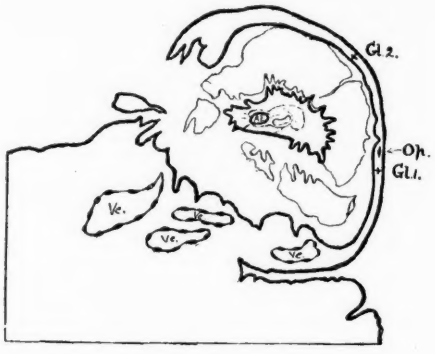
The mesoderm projects in a few short villi which are covered on the sides by the usual two-layered epithelium. "From the tips of the villi project broad columns of cells which spread out laterally so that they frequently unite with neighbouring columns." The outer surface of the trophoblast shell, which is thus formed, is in contact with maternal tissue. The spaces between it and the villi and surface of the blastocyst contain well-preserved blood and constitute the beginnings of the intervillous space which communicates with maternal capillaries through gaps in the trophoblast shell.

Ovum of Johnstone. All of the ova above described as exhibiting an operculum, except the original Teacher-Bryce specimen, show it with a broad adhesion of the blastocyst to the decidua capsularis. I, therefore, approached Dr. Johnstone, whose uterine ovum has the apex of the blastocyst free from the decidua. Dr. Johnstone most kindly placed his specimens at my disposal. The little ovum is poorly preserved from having been obtained too long post-mortem, and the decidua capsularis and the blastocyst itself had both been ruptured by pressure during removal of the uterus. Nevertheless, it is a valuable ovum and thoroughly reliable conclusions can be drawn from it upon many points in spite of these defects.

The ovum is about the same size as T.B.2. It is embedded in a small prominent lobule of decidua which is deeply congested. The decidua capsularis is thin and degenerate. The oval blastocyst, which measures 2.72 × 1.66 × .84 mm., is ruptured towards the base of the lobule. This involves the immediate neighbourhood of the embryonic rudiments, and has probably caused the separation of the two sacs, which was one of the difficulties Johnstone found in interpreting the embryonic structures. The blastocyst is oval in shape, covered all over by villi of considerable length with occasional branching, and has a very thick trophoblast shell like that of the Strahl-Beneke ovum. Post-mortem changes had produced detachment of the villi from the decidua through the trophoblast, but the usual features, such as infiltration of the decidua and connexion with maternal vessels are readily made out.

The embryonic rudiment consists of two vesicles, both of which are damaged. It was not felt possible to distinguish which was amnio-embryonic and which yolk-sac. One of the suggested explanations was that they represented twins. On examination of the vesicles with high power, the writer found that one of them, the second in Johnstone's description, was provided with a well-

defined basement membrane (membrana prima of Hensen), the cells inside which could be recognized as columnar in shape. In T.B.2 and Strahl-Beneke the amnio-embryonic vesicle likewise is provided with a basement membrane, while the yolk-sac is not. It is in my opinion, therefore, clear that Johnstone's No. 2 vesicle is amnio-embryonic. The vesicles are attached to the wall of the blastocyst by their opposite ends (see diagram) in the position which Bryce shows to be normal. On the strength of the relationship observed between the end of the yolk-sac and the operculum in both T.B.1 and T.B.2, search for the operculum was directed to



Text Fig. 2.

the area of the capsularis opposite the end of the yolk-sac with immediately successful result. A mass of long, flattened cells with large deeply-staining nuclei, degenerate but characteristic, was found. This is embedded in the thin degenerate capsularis, and is mostly covered externally by a layer of degenerate material enclosing a few leucocytes. The internal appearance is, however, more significant, the remains of the operculum being shut off from the implantation cavity by a thin layer of lumpy material which quite clearly corresponds to the shield of fibrin which is such a characteristic object underneath the aperture of entrance of T.B.1. The structure extends through 33 sections (17.2.5 to 20.1.1), and, therefore measures in this direction 0.33 of a millimetre. In section 18.2.5 it measures 0.4 mm. In spite of its degenerate character there can be no reasonable doubt as to the correctness of the identification of it as the operculum. It is easily distinguished under high powers from invading processes of syncytium. The latter never extend through more than three or four or at most six sections and are better preserved. Its position relative to the blastocyst and embryonic vesicles is shown in text Fig. 2, which is traced

from a photograph of section 17.2.5. It lies very diagonally across the capsularis as if it had been drawn out unevenly and much flattened. Without reference to the opercular structures in T.B.2 its nature could not possibly have been made out.

The importance of this specimen lies in the fact that the apex of the blastocyst is free from the decidua capsularis, and, to judge by the degeneration of the operculum, it has clearly been separated from it for some time. Probably the detachment occurred at much the same stage as in the case of the T.B.1. It was doubtless a larger operculum. No trace of the point of attachment could be made out on the blastocyst.

Thus in three specimens of which a complete series of sections has been available three stages of the operculum have been found. Confirmation is thereby provided for the theory of Schlagenhaufer and Verocay that the "Verschluss" or operculum is an invariable constituent of the human ovum, and that it is a temporary structure which commences to disappear at a very early period. Most probably what is seen in T.B.1 and Johnstone's ovum represents the normal behaviour of the blastocyst, viz., that it is early separated from the decidua capsularis. Under the remains of the operculum a pad or shield of fibrin is formed which seals the inner mouth of the aperture of entrance securely. This, like the cellular operculum itself, becomes flattened out and disappears in the degenerating capsularis, and also no mark is left on the blastocyst. The usual bald area at the apex might be due to the separation in such cases as the T.B.2 or Schlagenhaufer and Verocay, but it seems more probable that it is due to atrophy of the villi, which, where they are in contact with the degenerating centre of the decidua capsularis soon cease to grow.

The adhesion of the blastocyst to the decidua capsularis is not necessarily an abnormality. It is rather to be regarded as one of those variations which are so commonly observed in the early ovum.

Ovum "Sch." of v. Mollendorff. Description of the operculum leads up to consideration of the ovum "Sch." of von Mollendorff, which is in some respects the most interesting of all the new specimens. The account of the ovum is most painstakingly and thoughtfully worked out and the full details which are given form most valuable data for comparison. There are also discussions of other human ova and of the comparative anatomy of embedding and development.

The ovum "Sch." is described as the youngest known abortive ovum. It was found in a decidual cast of the uterus.

History. The patient was a healthy 1-para. On the 5th of January, 1921, between 5 and 6 p.m., abortion occurred after about half an hour of

pains in the abdomen. The whole specimen was placed in formalin solution 24 hours later and subsequently fixed again in sublimate, and the result is quite good.

Menstruation was regular and of four weeks' type. Last period began Dec. 2, 1920; next was due on Dec. 30, 1920, and was missed; abortion occurred on Jan. 5, 1921.

The history of coitus given by the husband was Dec. 6, 1920, that is 30 days before abortion; Dec. 23, 1920, that is 13-14 days before abortion; Jan. 2-3, 1921, that is 3-4 days before abortion.

Following the reckoning of Bryce and Teacher (1908), von Mollendorff deducts 24 hours for the period up to fertilization and 24 hours for the abortion, and gives the age of the ovum as 11-12 days, that is two days younger than T.B. 1. Fertilization occurred 20-21 days after the start of the last period, and for the date of implantation he accepts the opinion of Graf von Spee, 1915, that a free stage of 10 days' duration is most probable. The history, therefore, closely resembles that of T.B. 1.

The ovum was found in a little oval area slightly projecting from the decidua which was marked by shallow furrows. It is enclosed in decidua which shows practically identical characters with that of T.B. 1, the decidua cells being young but characteristic and more advanced close to the ovum. Little more than the compact layer had been shed and the condition of the glands is also like that in T.B. 1. The ovum lies in a rounded cavity in the compact decidua which is bounded by a narrow necrotic zone. The decidua capsularis is relatively thick and well preserved and there is an aperture of entrance very similar to but rather broader and shallower than that of T.B. 1. At the deep end of this crater-like depression a cellular mass forming the pole of the ovum is attached to the decidua by a mass of fibrin in which it is embedded as in a collar.

The author regards the cellular mass as the embryonic rudiment. From it the blastocyst projects as an elongated body of thick club-shape obliquely into the implantation cavity which is filled with blood and trophoblast. Maternal vessels open into it at various points. The trophoblast is composed largely of well defined cells having the character of cytotrophoblast. There is a considerable amount of syncytium which is principally at the periphery.

The dimensions of the cavity in the decidua are 1.44 mm. by 1.00 mm. compared with 1.9 mm. by .9 mm. by 1.1 mm. in T.B.1. The long narrow blastocyst measures 0.64 mm. in length by 0 32 mm. in breadth, and 0.14 mm. in the third dimension estimated from the sections. The blastocyst in T.B.1 measures 0.77 mm. in the longest diameter which could be found, but this is greatly affected by an irregular projection at one end of the blastocyst, and probably the shorter measure given, viz., 0.63 mm would more fairly represent its real diametric measurement.

In its dimensions, therefore, the ovum "Sch." is considerably smaller than T.B.1, and Von Mollendorff assumes that it is considerably younger. He also regards it as younger than "Miller" and "Kleinhans."

The most striking resemblances between T.B.1 and "Sch." are (1) the presence of a complete necrotic zone which forms the lining of the implantation cavity; (2) the large size of that cavity compared with the blastocyst; (3) the presence of an irregular trophoblast straggling through that cavity from the blastocyst wall to the decidua; and (4) the absence of invasion of the decidua by the fœtal elements. The points of contrast are (1) the shape of the blastocyst; (2) the absence from its interior of a structure comparable to the embryonic rudiment; (3) the structure of the mesoderm; and (4) the different cellular character of the trophoblast. The long club-shaped blastocyst has some resemblance to the long thin blastocyst of the guinea-pig about the 9th or 10th day. It is completely filled with mesoderm, which presents a denser and more fibrous structure than the mesoderm of the T.B.1 Von Mollendorff interprets this as possibly the result of pressure of the surrounding tissues upon the invading ovum. The shape of the blastocyst, however, would have been altered into conformity with the globular shape of the later stages as the pressure was released by development of the implantation cavity. He, therefore, regards this as the younger stage of the mesoderm, and the evolution to the later stage would have been accompanied by a loosening of the structure and an increase of fluid in its meshes. The cells of the mesoderm are of two types—(1) embryonic connective-tissue cells, and (2) round cells having peculiar foam-like structure which suggests that they had contained fat.

Von Mollendorff refers to the amnio-embryonic vesicle and yolk-sac of T.B.1 as "Zell-strange," from which the embryonic structures of later stages could not be derived, and specifies that there are no such "Zell-strange" in the mesoderm of his ovum. Von Mollendorff, like some other critics of the Teacher-Bryce ovum who have not seen the specimen, has obviously quite failed to appreciate the striking and definite character of the structures thus referred to.

The body which Von Mollendorff regards as the embryonic rudiment (Embryonalknoten) is situated in the deep part of the aperture of entrance embedded in a collar-like mass of somewhat dense lumpy fibrin. It is composed of relatively large cells of varying size, and showing some difference in staining reaction and nuclear form. It is situated on the extreme outer pole of the blastocyst, and is continuous at its margins with the trophoblast covering the rest of the blastocyst. It is roughly of hemispherical

shape and very well defined. The cells composing it are somewhat degenerate, and Von Mollendorff regards it as perhaps a somewhat degenerate remains of the embryonic rudiment. To the writer it is clearly the remains of the operculum, and the collar of fibrin around it is the " internal shield " of fibrin.

The trophoblast of the " Sch." ovum consists principally of well-defined cells somewhat irregular in size and shape, but generally polyhedral. These form thick columns stretching out from the wall of the blastocyst through the implantation cavity. In places they are mingled with *masses* of syncytium (plasmoditrophoblast), and at the outer margin of the ovum there is more abundant syncytium both in the form of solid masses and spun out into vacuolated networks like those of T.B.1. Some of the syncytium shows the striated border as it is seen at later stages of development.

As to the cytotrophoblast, Fig. 15 shows a mass of cells not very different from those forming the trophoblast shell of T.B.2 or Peters. The photograph Fig. 8 shows the cytotrophoblast projecting from the blastocyst in thick columns with syncytium on either side of them. There are even suggestions of mesodermic villi. Von Mollendorff claims, and in this he is followed by Grosser, that this is a first generation of cytotrophoblast which changes into plasmoditrophoblast producing the condition seen in T.B.1. To me this is a reversal of the order of things. The cytotrophoblast in ovum " Sch." is a more differentiated tissue than that of T.B.1. The picture, which is produced, is strongly suggestive of the result which would be attained by the formation of cellular villi from the primitive cytotrophoblast of T.B.1 according to Bryce's theory of 1908, as will be discussed below.

The writer is forced to the conclusion that Von Mollendorff has erred in taking for the embryonic rudiment a structure having a totally different function and situated at a totally different part of the blastocyst from that which the embryo would naturally occupy. In our opinion, the ovum is rightly described as an abortive ovum, the embryo being entirely absent, doubtless having failed to be formed.

The history presents some difficulty if one would regard " Sch." as older than T.B.1, but it is probable that all the stages from Miller and Kleinhans to T.B.1 and " Sch." are gone through very rapidly, perhaps at most within 24 hours, and that great variations occur in the rate of development. The exact age of the specimens, therefore, does not matter so much as their relative ages, and these should be judged not by considerations of size or history only, but as Von Mollendorff indicates, by the state of development of the component tissues. In conclusion, the structure of the trophoblast and mesoderm strongly suggests to us that the Von

Mollendorff ovum is slightly the older, and is, in fact, one of the much desired stages between T.B.1 and Peters. As that it is an ovum of great value, and probably reveals a normal stage in the development of the cytotrophoblast following the actively destructive plasmoditrophoblastic stage of T.B.1.

Part II. The Trophoblast.

The Teacher-Bryce Ovum No. 1 (T.B.1).

Prior to the discovery of von Mollendorff's "Sch." the original Teacher-Bryce ovum was the only one of the stages earlier than Peters, of which there was a complete series excepting Leopold's (1906), in which there is no embryo.

The history of the ovum has been often quoted. It was found in a decidual cast aborted $10\frac{1}{2}$ days after the missed period. Fertilization appears clearly to have resulted from a single coitus $16\frac{1}{2}$ days before its expulsion, and the abortion seems to have been precipitated by coitus about $1\frac{1}{2}$ days before expulsion. Bleeding, like the commencement of the period, was noticed about seven hours after this coitus. About 14 months later a healthy boy was born to the parents. The ovum was fixed in alcohol. It had lain for about 22 hours in a mixture of blood-clots and urine. This has produced considerable yet surprisingly little maceration of the decidua. It is a very striking fact that the ovum itself and the decidua close to it are much better preserved than the rest, and present most lively pictures of cellular activity.

The principal features were summarized in 1908 as follows:—

(1) The blastocyst is completely enclosed in decidua except at one point, where there is a small gap closed by a mass of fibrin and leucocytes. The wide gap closed by the mushroom-like mass of fibrin and blood-clot seen in Peters' ovum is entirely absent.

(2) The ovum lies, bathed in blood, in a relatively large implantation chamber, with the walls of which it is not united. There is no interlocking or mixing of maternal and fœtal tissues. The innermost layer of the decidua lining the cavity is in a state of advanced coagulation necrosis, and this, together with a certain amount of fibrinous deposit, forms a layer of dead material which is practically complete except at one or two points where blood-vessels have been opened up, and at one end where a hæmorrhage has broken into the implantation chamber.

(3) The wall of the blastocyst consists of an inner lamella (cytotrophoblast or cell layer) composed of cells rather ill-defined from one another, and continuous externally with an extremely irregular formation which has definitely plasmodial characters (plasmodi-trophoblast). This forms a straggling reticulum, the

meshes of which are filled with maternal blood (primitive blood lacunæ). There is no protrusion of the cytotrophoblast into the plasmodi-trophoblast strands.

(4) The cavity of the blastocyst is filled by a delicate tissue having the characters of mesenchyme. There is no cleavage of this early mesoblast into a parietal and a visceral layer; it does not form a distinct lamella round the wall of the cavity; and there are no protrusions from it representing future mesoblastic villi.

(5) The embryonic rudiment is represented by two eccentrically placed vesicles slung in the mesenchyme by fine protoplasmic threads. They are quite separated from the wall of the blastocyst by mesenchyme, and the cells forming the two sacs have definite and different characters, but *inter se* show no differentiation. The cells of the larger (amnio-embryonic) vesicle are cubical; those of the smaller (endodermic) vesicle are flattened.

To this description, which in the main is correct, a few emendations and many additions must now be made. The aperture of entrance has already been described. As regards the implantation cavity, there is perhaps rather more union of the ovum with its walls than we believed. In places, *e.g.*, at the lower end of Fig. 3 of the original memoir, the syncytium of the ovum is seen in continuity with the necrotic border of the maternal tissues. In view of the firmness of the somewhat similar adhesion between the operculum and the maternal tissue, it seems possible that this is a fairly strong adhesion between the ovum and the wall of the cavity —an anchoring strand. In other parts, however, similar masses of syncytium appear to have separated from the necrotic layer when vacuolation took place, and it is probably a temporary adhesion.

There is no inter-locking or mixing of living maternal and fœtal tissues as in the border zone of later stages. The only penetration of the maternal tissue by the fœtal is by the processes of syncytium seeking blood-vessels, as will be described in detail below.

We have rather exaggerated the amount of the spun-out vacuolated syncytium or plasmoditrophoblast to the neglect of the solid masses. The latter predominate at the upper end of the implantation cavity, the former at the lower end, probably indicating that the vacuolation was taking place at different times in different parts of the specimen. The vacuoles are seen in all stages in the syncytium. They appear first as little rounded bodies lightly stained blue, and not unlike nuclei but easily distinguished from them. These become cavities containing granular debris, and, lastly, cavities containing blood. Our interpretation of this as the evolution of the secretion within the syncytium has been

generally accepted. These cavities, however, have nothing to do with the intervillous space, an opinion which various commentators have erroneously attributed to the writers.

The striated border could not be made out on the syncytium. It is certainly absent from the masses which are invading the decidua in search of vessels;—these have clean-cut margins.

Much of the highly vacuolated and spun-out syncytium shows by its excessive affinity for eosin and the poor staining properties of the nuclei that degenerative changes have occurred.

The formation of the inter-villous space. The origin of the inter-villous space is bound up with the development from the stage of the Teacher-Bryce ovum to that of Peters' ovum.

In 1908 Bryce examined carefully all the sections for the beginning of villi, and all that he found was a few little bud-like processes of the cellular layer of the trophoblast, but the important fact which he observed was that these were not growing out into the existing syncytial processes, but rather between them. His conclusion was that the great syncytial (plasmoditrophoblastic) formation had nothing to do with the villi and intervillous space of the later stages, but was in all probability a temporary formation which disappeared when its function of excavating the implantation cavity had been performed. Masses of vacuolated syncytium are seen in the Peters' ovum and others of similar age, but they are small relatively to the amount of the cytotrophoblast. They are situated mostly at the periphery of that structure, and signs of degeneration have been observed in them, just as in T.B.1. The purpose of the excavation of the large space filled with maternal blood is presumably to provide room for the next development, viz., the formation of a thick layer of trophoblast principally cytotrophoblastic in type.

This takes place by proliferation and differentiation occurring practically all over the blastocyst. Proliferation would occur especially at the points where the mesodermic villi were going to form, while on the areas of the blastocyst between these differentiation would predominate. In the latter areas the very primitive and irregular cytotrophoblast of the Teacher-Bryce stage would differentiate in the direction of Langhans' layer with a thin covering of syncytium, and this two-layered epithelium would extend along the sides of the developing mesodermic villi. The primitive cellular villi would develop as masses of cells having the general cellular characteristics of the primitive cytotrophoblast, although tending to become more regular. This would explain the character of the extensive trophoblast shell which consists of polyhedral cells presenting greater resemblance to the cytotrophoblast of the Teacher-Bryce ovum than to the actual Langhans'

layer of the later stages. The primitive cellular (cytotrophoblastic) villi then would push the primitive syncytium before them and eventually burst through it, and, growing out laterally, would coalesce with one another. By this lateral growth a shell of cellular trophoblast is formed in which many openings are left corresponding to the orifices of the maternal blood-vessels. At first considerable spaces are left outside it to which the name " pre-villous spaces " used by Schlagenhaufer and Verocay would be not inappropriate. As union and the formation of the border zone (" Umlagerungszone " of Peters) took place these spaces would be reduced to narrow cavities lined on the outside by maternal endothelium and on the inside by the trophoblast. In the later stages, when the trophoblast becomes reduced to the masses at the tips of the anchoring villi, the distinction between the pre-villous and intervillous spaces would disappear.

The plasmoditrophoblast or syncytium probably differentiates all over the surface of the blastocyst from the outer parts of the primitive cytotrophoblast and comes to form the characteristic thin syncytial sheath of the villi and the internal floor of the intervillous space. This would be the definitive or permanent[1] syncytium in contra-distinction to the primitive or destructive syncytium,[2] which gradually disappears.

The Peters' ovum shows the stage when the intervillous spaces are very small. Further development follows automatically as the villi grow. The account here given of the formation of the inter-villous space agrees in principle with those given by Frassi, Jung, Linzenmeier and Johnstone, except in so far as they were not under the necessity of explaining the first advance from the stage of T.B.1.

On the question of a circulation around the young ovum. There can be no doubt that a gentle but efficient circulation flows through the intervillous space, but what occurs in the implantation cavity or pre-villous space? An attempt was made to answer this question by further study of T.B.1.

In the original memoir it is mentioned that blood-vessels actually opened into the implantation cavity only at a few points. On re-examination, this was found to be correct, but there are also many points at which blood-vessels enter into relations with the cavity but open connexion between their lumen and that of the cavity cannot be made out. At such points the wall of the implantation cavity, including both the necrotic layer and the living decidua immediately outside, presents the appearance of having been opened up and dissolved, and in the gaps thus created a mass or masses of syncytium are seen which appear to

1. " Zotten Syncytium " of Grosser.
2. " Implantations-syncytium " of Grosser.

be burrowing towards, and in some cases actually attacking, the vessels (Figs. 20 and 21. Compare photos 22 and 23). The picture varies very greatly, but these two figures show two clear types or stages of the process. In one the endothelial tube is seen to be separated from the other decidual tissue so that it lies free among the *débris* as if dissected out by a process of histolysis. The lumen of the endothelial tube is occupied by a thrombus. In the other figure the endothelial tube is seen with a mass of syncytium pressing into it, but not yet breaking through, and the blood in the lumen is fluid, but at the end of the figure the endothelium has disappeared, and, as can be confirmed from other sections, there is a gap in the wall of the capillary which is filled by thrombus.

Between the two masses of syncytium in this figure a streak-like arrangement of the blood is seen. This appearance is seen in the neighbourhood of a number of invaded vessels. Fig. 25. There seems to have been a flow of blood from the vessel into the implantation cavity pushing the syncytium aside. To a pathologist these are clearly hæmorrhages taking place into that cavity. Except in a very few instances thrombosis has followed at the gap in the vessel wall, but it has not occurred within the implantation cavity.

The absence of an open persistent communication between the vessels and the implantation cavity is difficult to understand, and the writer suggests that it indicates that the opening of the blood-vessels is very like a morbid process at this stage, and that the natural reaction against invasion by an alien body takes place, viz., thrombosis. The result, on this theory, is a blood chamber filled by hæmorrhages rather than a circulation.

Yet this is not the full explanation, for there is one large and distinct open mouth of a blood-vessel. This is the vessel whose communication with the implantation cavity is shown as Fig. 5 on Plate 5 in the original memoir, and as Fig. 24, Plate 13, in the present one. The picture shows the vessel mouth towards one side. Actually in the middle it is considerably wider and forms a relatively large gap in the necrotic layer. It is shown in correct proportion in text Figs. 4 and 5, p. 205. Following this orifice through the series, it is found that it is the opening between the implantation cavity and the large venous sinus which is such a characteristic structure underlying most young ova. A mass of syncytium, surrounded by *uncoagulated* blood, hangs down into the mouth of the sinus. The endothelium at one side of the mouth is well preserved, but has disappeared from the other side where the syncytium lies in apposition to the necrotic tissue. There is no suggestion at this point of a flow of blood *into* the implantation cavity.

If my interpretation is right, this vessel represents the main drain of the implantation cavity into the maternal veins. The blood was flowing into the implantation cavity in jets from many little vessels situated at various points on the roof and sides of the cavity, and was flowing out by the large sinus at the base. As these vessels are all very small it is impossible to be sure from their microscopic characters whether they are arterial or venous capillaries, but the direction of the blood flow from them is clear. The hæmorrhage referred to in paragraph 2 quoted on page 187 as having broken into one end of the implantation cavity is really the inflow from several vessels in that neighbourhood. Figs. 17 and 25.

The venous sinus is filled up to quite near the implantation cavity with red thrombus, and strands of it extend into the implantation cavity. The explanation of this is that the sinus has burst a little distance below the margin of the implantation cavity, producing a relatively extensive hæmorrhage into the decidua below the upper half of the implantation cavity, text Fig. 5. There is no sharp break in the vessel wall, but rather an opening up of a considerable area of it. Doubtless the sinus had been greatly distended by congestion. Most probably thrombosis followed immediately upon this rupture and effusion into the tissues, and it finished the circulation such as it was. The hæmorrhages which have occurred into the surrounding decidua seem to indicate that there had been a rising congestion of the uterus of considerable intensity. Text Fig. 5 (p. 205) and Fig. 17.

It seems to the writer most probable that the ovum was in a very early stage of its connexion with the maternal circulation. Only two or three vessels, or perhaps even only one, were actually in free open communication with the implantation cavity, that one being, however, the main outgoing channel to the underlying venous sinus. Then the congestion due to the untimely coitus led to hæmorrhage from, and thrombosis in, the great sinus, and abortion commenced.

This is, of course, a speculation, but it is in line with the phenomena of abortion due to trauma at later stages of development. If it be correct, it would mean that the circulation stopped suddenly, and all activity came to a standstill in the ovum. This would explain the surprisingly good preservation of the ovum and the signs of lively activity in it such as the karyokinetic figures and the phenomena of invasion of blood-vessels by the syncytium which have remained fixed for us to see as they had been just prior to its death. Likewise, it suggests the probability that the ovum is normal.

On comparing the relations of the trophoblast to blood-vessels and glands in T.B.1 and T.B.2 very striking contrasts emerge.

In T.B.1 the invasion is by primitive syncytium which dissolves an area of the necrotic zone and opens up and destroys the vessel and the living tissue around it. On the other hand the gland No. 1 in text Fig. 3, p. 204 is allowed to stand out unbroken into the cavity. Invasion of gland is not essential at this stage. Invasion of vessels is purposive, the opening of blood-vessels and bleeding from them into the implantation cavity being essential to the survival of the ovum.

In later stages glands are destroyed, but this is also incidental.

In T.B.2 the relations of the trophoblast to the vessel are very different. In most instances the vessel is opened by syncytium, but in some cases the cytotrophoblast seems to be the active agent. In either case there is no appearance of solution of tissue round the endothelial tube as in T.B.1, but instead there is a growing of the trophoblast along and around the endothelial tube and a quiet replacement of the endothelium by the fœtal tissue, Figs. 12 and 13. The result of this is not hæmorrhage but the establishment of new channels for circulation between the intervillous space and the maternal blood-vessels as has often been described before.

It is of interest to note that the invasion of vessels by chorion-epithelioma resembles the later type, but in the tumour both layers of the chorionic epithelium attack the maternal tissues and their growth is highly irregular. In my opinion, the tumour activity is something new and different from that of the normal ovum in spite of the resemblances between them.

Ova younger than T.B.1.

The ovum described by John Willoughby Miller in 1913 is clearly considerably younger than T.B.1. It was discovered in curetted material at the Heidelberg Clinic for Diseases of Women. Only five sections exist, three of which traverse approximately the largest diameter of the ovum, and in them the embryonic rudiment is recognizable. The history does not give accurate data as to the age of the specimen. The whole ovum measures .83 mm. in diameter and the cavity of the blastocyst .44 mm. As the embryo is usually situated towards one side of the blastocyst it seems probable that the section is not equatorial, and that the greatest dimensions of the ovum would have been slightly larger.

The cavity of the blastocyst is filled with a mass of delicate finely granular material lightly stained with eosin which has retracted considerably from the ectoderm. Especially in the neighbourhood of the rudiment this is pervaded with scattered cells of the type of "young fibroblasts still relatively poor in protoplasm." Some of them show very beautiful and distinct karyokinetic figures. The mass of mesoderm is clothed round the

edges with a thin layer of similar cells. There is no trace of mesodermal villi. About the middle of the mesoderm, but somewhat eccentrically placed, lies the embryonic rudiment which is described by Miller as the rudiment of amnion and yolk-sac together, but clearly it is only the former, and it is probably cut tangentially. It is a little round mass of cells with the commencement of a cavity. (See Bryce's memoir.)

The ectoderm, according to the author, "already shows differentiation into cytotrophoblast (Langhans' layer) and plasmoditrophoblast (syncytium). There exists, however, throughout no fundamental difference in the nuclear forms or in the coloration of nucleus and protoplasm so that one receives the distinct impression of a continuous transition between the two cell types, as expressly stated also by Peters, Leopold and Jung, for their cases. The regular arrangement of Langhans' cells as a basal layer of the trophoblast is not everywhere distinct, and the differentiation of the single cell individuals from one another is in places quite indistinct. Mitoses are fairly frequent in the cytotrophoblast."

"The syncytium which shows the well-known lacunæ, although not a honeycomb-like arrangement, occupies not nearly so much space as in the next older ovum of Bryce and Teacher, and the large blood spaces are not present in greater number than one dozen per section."

In several places the maternal capillaries are seen to have been opened and blood and leucocytes are present in the spaces of the plasmoditrophoblast.

The ovum is closely surrounded by the maternal tissues which in a very limited area show commencing transformation of the stroma cells into decidua cells. The necrotic zone, such as is seen around T.B.1 and von Mollendorff's "Sch.," is completely absent. Rather the syncytium "everywhere and throughout touches tissue with well-preserved nuclei." The limits of the ovum in relation to the maternal tissue in part follow wavy outlines in which there are large lacunæ at the periphery of the syncytium. In parts that structure seems to run radially towards the mucous membrane. Along the border line polymorpho-nuclear leucocytes are present in small numbers.

"The cell complexes of the two organisms can, however, be easily distinguished from one another. There can be no question of a zone in which there is mutual penetration of fœtal and maternal elements (Umlagerungszone of Peters)."

"The small mass of blood in the immediate neighbourhood of the ovum deserves mention."

Destruction of the uterine glands by the trophoblast is not

seen in the sections, although at points the two kinds of epithelium touch one another. There is little change in the shape of the glands. The mucous membrane further removed from the ovum is œdematous and presents the picture of the pre-menstrual or early pregnancy reaction.

Miller's paper has only one illustration, which is rather poorly reproduced. It represents one of the principal sections of the ovum, and the original picture must be an excellent drawing. As reproduced the magnification is rather low, and one cannot help feeling that there must be a great deal of detail which it does not show. To Professor Bryce and the writer the resemblances to our young ovum are more striking than the differences. The cellular characters of the trophoblast and the mesoderm are in general very similar in the two specimens. The striking differences are (1) the much less vacuolated condition of the plasmoditrophoblast in Miller's ovum; (2) the absence of the large blood-filled implantation cavity, and (3) the living condition of the maternal tissues around the ovum in contrast to the necrotic condition in the later stage. The significance of these differences will be dealt with later. In the meantime it is sufficient to say that the Miller ovum is a completely consistent earlier stage of the T.B.1.

After describing the large blood spaces in the syncytium Miller continues as follows:—"I have the impression that they do not owe their formation to a vacuolization of cell heaps primarily solid through a proteolytic ferment, also not to a kind of self-digestion, but that the syncytium, after erosion of the dilated capillaries with displacement and destruction of the endothelium, takes over the lining of the blood spaces." With this interpretation we agree generally. The spaces in the outer layer of Miller's ovum are not those of the vacuolated network of T.B.1 but the larger spaces between the solid masses of syncytium. As already explained, there can be no doubt that the spun-out sponge work of syncytium does originate by the formation of vacuoles presumably secretory in character in the solid masses of protoplasm. As the next phase develops and the secretion is shed, maternal blood flows into the vacuoles producing the well-known picture. This, in my opinion, is the natural evolution of the more solid syncytium of the stage of the Miller ovum. Vacuolation is seen in the syncytium of the Kleinhans ovum, which is probably intermediate between Miller and T.B.1.

The Ovum of Kleinhans.

It was shown by its discoverer in 1911, but only described fully by Grosser in 1922, and presents a very close resemblance to that of Miller. It was found in the uterus of a young woman

who had committed suicide by drowning. The presence of an ovum was not suspected, but a single section of it was found in one of the two large celloidin sections of half the uterus which had been prepared. The section is almost whole, and shows a beautiful picture of a very superficial embedding between the mouths of two glands. The preservation is exceedingly good, but unfortunately the mesoderm is absent from the section. Grosser regards this as due to shrinkage during the celloidin embedding. The external dimensions of the ovum are 0.8 mm. by 0.65 mm., and the cavity of the blastocyst measures .035 by .015. Grosser regards the section as being probably near the meridian but obliquely cut. Comparing it with the T.B.1, we are inclined to regard it as more probably a considerable distance towards one side. A plane passing a little above the line between glands 1 and 2 in text Fig. 3 p. 204 might represent it. The wall of the blastocyst presents a close resemblance to that of the T.B.1, and the cavity in the decidua is occupied by a large amount of straggling syncytium, among the masses of which there are cavities full of blood and leucocytes. The syncytium is more vacuolated than that of the Miller ovum, and probably represents a stage between it and T.B.1. There is no necrotic zone, but there are early degenerative changes in some of the maternal cells close to the syncytium. The pole of the ovum is almost bare, probably as the result of post-mortem changes or through accident of the processes of preparation. Grosser regards this specimen as re-habilitating the Teacher-Bryce ovum, which many investigators have "regarded as wholly pathological and struck out from the list of normal objects." I agree with Grosser's estimate of the value of Kleinhans's ovum and its relation to the Miller and Teacher-Bryce specimens.

Summary.

The relations between the three may be summarized as follows:—

The Miller ovum represents the completion of a period of growth of the trophoblast during which its two layers become clearly differentiated. The relations between it and the maternal tissues are those of contact with little provocation to reaction. In Kleinhans we have the secretory activity of the syncytium commencing, and therewith irritation of the maternal tissue becomes more pronounced and emigration of leucocytes more abundant, and degenerative changes commence.

T.B.1 and von Mollendorff represent the results of the full activity of the primitive syncytium, most of which becomes vacuolated and spent. On the maternal side the necrotic zone

attains its full development and blood-vessels are violently invaded and hæmorrhages occur into the implantation cavity.

The establishment of an open connexion with the great venous sinus below the ovum marks the commencement of a true circulation in that cavity. It is probably effected during the quiet phase represented by Miller's ovum.

Part III. The Implantation of the Human Ovum.

Everyone who has studied the comparative anatomy and physiology of reproduction must feel that in attempting to apply data thus obtained to the human ovum great caution must be exercised. For in every order of animals, and even in different members of the same order, the connexion between the ovum and the mother is achieved in very diverse ways. Naturally one would turn to the primates for suitable comparisons, but so far as we are aware, rather less is known of the early stages in the apes and monkeys than of those in man, and the lemurs and the primate tarsius spectrum do not present the close analogy that might have been expected. Among the rodents, conditions are so different in the rabbit as to make comparison useless, and after consideration of the literature we have decided again that the best analogies are obtained from the guinea-pig and hedgehog. For the guinea-pig we rely on the classical descriptions of von Spee, a new abstract of which has been made emphasizing certain points which the present study has shown to be important. There has also been available for study and comparison with this a series of preparations made by Mr. N. H. W. McLaren, an account of which will appear elsewhere.

Von Spee's account of the ovum of the guinea-pig just before fixation to the uterus is so concise that it is better to quote it :—

"From examination of the fresh intact ovum of the guinea-pig we some years ago determined that on the sixth day after fertilization it consists of a little oval blastocyst about one-tenth of a millimetre in its longest diameter lying free in the cavity of the uterus and still enclosed in the zona pellucida. The cellular wall consists in the equatorial region of a single layer of very flat cells. At both poles of the ovum it appears thicker. At one pole (at which the embryonic mass and the rudiment of the placenta will be formed) at a certain stage the cellular wall of the blastocyst is many cells thicker and forms a little mass projecting into the cavity of the blastocyst (Hensen's Keimhugel). I call this pole henceforth the placental pole of the ovum. At the other pole the wall consists of a single layer of cells which, in contrast to the very flat cells of the equatorial region are cubical (Spee's Gegenpol).

This pole I call in the first place the implantation pole. This, after implantation, is the free end of the ovum into which the embryonic mass later passes and in which the embryo is eventually formed. The cubical cells of the ' implantationspol ' drive processes of their bodies through the zona pellucida, and thus, before the latter has been separated from the ovum, they enter into direct relations with the lining epithelium of the uterus and initiate the first fixation leading up to the implantation of the ovum in the uterine wall."

The rest of von Spee's observations are made on fixed material cut into serial sections.

The ovum is usually embedded near the anti-mesometral end of the slit-like cavity of the uterus. Embedding begins about six days and eight to ten hours after fertilization, and the ovum lies quite within the maternal tissues in two or three hours thereafter. The fate of the zona is not clear, but it is not carried into the implantation cavity. The cells of the ovum are so much larger than the maternal cells that there is never in the early stages any difficulty in telling the one from the other.

In the first known stage of embedding the cells of the " implantationspol " destroy as by a " sort of digestion " a few of the surface epithelial cells and substitute themselves for them. The ovum passes in and the underlying connective-tissue cells are next attacked and some of them are dissolved. There is a little cavity in the ovum at this stage on the attacking side of the embryonic mass, so that the thin line of outer layer cells seems like a mobile line of attack resting on fluid. Soon after the ovum has passed completely through the epithelium the embryonic mass increases and the ovum becomes more solid.

The last entering cells of the placental pole, as they pass through, become firmly united with the epithelial cells around the margin of the aperture of entry. That this union is a strong one is shown by the fact that through all the subsequent stage of destruction of maternal tissue the adhesion holds fast. A little later they grow along the deep aspect of the epithelium in a form very suggestive of the human operculum.

Degenerative changes quickly appear in the maternal mesodermic cells which become swollen and tightly pressed against one another throughout a wide area (Implantationshof) round the ovum so as to look somewhat like epithelial cells. It may also be remarked that they are like the young decidua cells close round the Teacher-Bryce ovum (T.B.1).

This swelling of the cells is the first change which is observed in the endometrium, which up to the attack by the ovum had remained as in the unfertilized uterus. Embedding takes place on

a perfectly healthy area free from congestion, œdema and furrows. Karyokinetic figures are remarkable by their absence near the ovum, and von Spee rightly regards this as proving that the epithelium is quite passive and that the changes in the mesodermic cells are degenerative. In the stage of Figs. 11 and 13, which are reproduced on Plate 14, the degeneration has progressed rapidly. Cytolysis has produced a cavity filled with a "thin emulsion," and the damaged cells in part have broken down into a deeply staining homogeneous mass, enclosing some vacuoles, which he calls "symplasma." Outside the region of degeneration reactive changes are just beginning. There are at this stage no migration of leucocytes (although he notes that there is one in Fig. 11) and no hæmorrhage. The blood-vessels indeed show a much higher resistance than the cells, which he attributes to the influence of the circulating blood in them hindering the cytolysis.

In the next stage widespread destruction of the maternal tissue occurs and a great irregular cavity is formed in which the long straggling blastocyst develops. The epithelium is stripped from its base, but it and its adhesion to the ovum hold fast and keep this cavity distinct from the uterine cavity. Already also reaction of the inflammatory type has begun outside the zone of destruction and degeneration and in from 10 to 16 hours from the beginning of implantation a "sort of granulation tissue" has formed which "hinders or limits" the destructive activities of the ovum.

As to the force by which the ovum embeds, to von Spee it is clear that it is nothing but the living force of the ovum itself, which, "like an alien parasite," attacks and burrows into the maternal tissue. For a comparison which is both apt and suggestive one may take the penetration of the human skin or mucous membrane by the blunt-ended cercaria of Bilharzia.

The implantation cavity in the guinea-pig is never filled with maternal blood and the nutrition of the ovum is of the embryotrophic type up to a stage of development *far* more advanced than is the case with the human ovum considering the difference in the length of the period of gestation. The placenta of the guinea-pig also where alone a maternal and fœtal circulation come together, is formed only where the ovum has remained attached, viz., in the neighbourhood of the point of entrance. The form of the blastocyst is one which could hardly come into human development.

The ovum of the guinea-pig, therefore, diverges early and radically from what seems probable for the human ovum. While agreeing, therefore, with the accepted view that the penetration of the human ovum into the maternal tissue is probably similar to that of the guinea-pig ovum, the writer believes that, for the later phases

of implantation and for attachment, there is closer analogy with the hedgehog.[1]

The ovum of the hedgehog, after developing into a small blastocyst, comes to rest in a deep groove formed by decidual swellings from either side of the uterus. At this stage it measures about one-tenth of a millimetre in diameter, and it grows slightly and develops considerably before it adheres to the endometrium. Definite adhesion and the penetration of the trophoblast by blood are seen when it is about 0.2 mm. in diameter, Fig. 30. Whether the decidual formation begins prior to the ovum reaching its site of implantation or not Hubrecht was unable to determine, but certainly the development of the decidual swelling occurs before there are any signs of the attack by the ovum upon the uterine epithelium. This is an important difference from what happens in the case of the guinea-pig, and is most probably what occurs in the human species.

The embryo destroys the uterine epithelium in its immediate neighbourhood and the underlying tissues to an extent sufficient to open the maternal vessels. Resink finds no evidence that the ovum "eats its way into" the maternal tissues. At the stage at which this erosion takes place the extra-embryonic ectoderm has developed all over the ovum into the thick layer of cells for the description of which Hubrecht invented the term "trophoblast" or "trophic epiblast" and the embryonic knob and the beginnings of endoderm are distinct, Figs. 30 and 32. Resink describes this as the growth stage or pre-placental stage of the trophoblast. He prefers to use Duval's term "ectoplacenta," and speaks of it as "primitive ectoplacenta." The maternal blood flows from the opened vessels into spaces in the primitive ectoplacenta but more into a space between it and the decidua. Probably it does not circulate in the spaces of the primitive ectoplacenta but returns from the larger space directly into the maternal vessels. There is, therefore, some circulation, but it is not comparable with the later true placental ("euplacental") circulation. It is rather like the condition in T.B.1.

The groove in the neighbourhood of the ovum becomes occupied by a plug of clotted blood which Resink regards as having flowed not directly from the maternal vessels but from spaces in the ectoplacenta, a considerable area of which projects at this stage beyond

1. It is necessary to take the classic work of Hubrecht along with the account given by Resink, who re-did the work under the supervision and with the co-operation of Hubrecht, as there are many changes of interpretation. Unfortunately, Resink's publication is rather inaccessible. It is advisable also to read it along with the original monograph as there are numerous references to the old illustrations. For the embryo later papers such as those of da Costa and Baumeister must be consulted.

the margin of the destroyed epithelium into the uterine cavity. Figs. 31 and 32. The ovum at this stage, therefore, is of the incompletely embedded type and the mode of embedding recalls the old circumvallation theory of the formation of the decidua capsularis. The closure is achieved when the blood clots between the lips of the decidual swellings and adheres to them in consequence of superficial necrosis. The growing together of the lips of the decidua, which Hubrecht originally described, apparently does not take place, but there is a firm union of the degenerate decidual tissue and blood clot as if they had melted into one another. There is considerable variation in the size of the space between the lips of decidua and of the plug of clot. There is also considerable variation in the size of the ova in the same uterus.

After this a secondary development of trophoblast occurs and mesoderm and blood vessels are brought to it first by the yolksac, the great development of which contrasts with its small size in the human ovum, and then by the allantois. The definitive placenta is formed from the allantois. Most of the primitive ectodermic formation, which includes the original trophospongia of Hubrecht and the large multinucleate phagocytic cells (deciduofracts) which occupied the space between the trophoblast and the decidual membrane, become degenerate and are pushed by the growing ovum against the wall of the uterus and to a great extent disappear.

In the later account of the embedding and placentation of the hedgehog a very important point is the recognition of two generations of ectoplacenta (trophoblast), the first of which is temporary and concerned with nutrition of the embryotrophic type. The second is that in which the maternal blood really circulates and in which the type of nutrition becomes hæmotrophic through the proximity of the maternal blood to the allantoic vessels. A fundamental difference from the embedding in the rodents is that at all stages the decidua of the hedgehog forms a close fitting envelope around the growing ovum. Other fundamental features are that (1) the embryonic ectoderm projects as a knob into the cavity of the blastocyst and never spreads out on its surface; and (2) the definitive (allantoic) placenta forms at the same pole of the ovum as the embryo. The embryonic rudiment in the hedgehog goes with the implantation pole of the embedding ovum not with the outer pole as in the guinea-pig. That it probably behaves in the human ovum as in the hedgehog is shown in Bryce's memoir.

Implantation of the Human Ovum. Before attempting to describe this, certain peculiarities of human anatomy must be noted. The human unfertilized ovum is relatively large compared with those of the animals we have chosen for comparison. The newly-embedded ovum of the guinea-pig, considered as a sphere, is less

than one-tenth of a millimetre in diameter. The ovum of the hedgehog is about the same size as that of the guinea-pig, but is considerably larger by the time of embedding, as already mentioned. Da Costa's Fig. 13, reproduced as Fig. 29, shows its structure and state of development and the commencing destruction of the maternal epithelium by the implantation pole of the ovum.

The ripe human ovarian ovum measures on the average .25 of a millimetre according to Waldeyer, and other authors have given the limits of size as from .22 to .32 of a millimetre. Doubtless it embeds itself as a blastocyst, and most probably it is still about that size. The discovery of the operculum and its relations to the embryo warrant us in asserting that it will have two poles—an entering or implantation pole and an adhering or closing pole.

The Fallopian tubes of the human subject are enormously longer than those of the guinea-pig or hedgehog, and, assuming that fertilization occurs in the outer part of them, it seems probable that the period occupied by the ovum in passing through the tube to the uterus would be longer than in the small animals. Newer investigation, however, according to George W. Corner, shows that the length of the Fallopian tube does not matter as in most animals the progression through it occupies three to four days.

Grosser, in Keibel and Mall's *Embryology,* suggests that implantation of the human ovum takes place about nine or ten days after fertilization instead of seven or eight as formerly suggested by von Spee, who also now regards the tenth day as the likeliest date of implantation. If these views are correct, the greater part of the free life of the human ovum is spent, not in the tube, but in the uterus, the structure of which seems to be very suitable for its reception and nourishment. As in origin so also in cellular character the glands of the body of the human uterus differ from those of the cervix. The latter are of the mucous type, while the glands of the body resemble serous gland.

The cavity of the body of the uterus is very large, and is lined by a relatively thick mucous membrane which undergoes periodic and considerable thickening in the pre-menstrual stage of the menstrual cycle. On the one hand, the stroma cells show considerable development in the direction of becoming decidua cells, and, on the other, there is great glandular hyperplasia.

In relation to early pregnancy, the state of development of decidua cells is found to differ greatly; for example, in T.B.1 and T.B.2. But in all cases in which the young ovum has been found in the uterus, whether extirpated during life or removed at autopsy, the leading feature has been the great thickness of the endometrium, and on microscopic examination the enormous hyperplasia of the uterine glands. This feature of the uterus would appear very

significant if we are to admit the possibility that the ovum lies free in it for four or five days. The proliferation of the glands is doubtless connected with the provision of abundant pabulum for the ovum (uterine milk; embryotrophe of German authors). The secretion of the glands of the body of the uterus is albuminous, and, as already noted, glycogen is said by Linzenmeier to be present in it.[1] It seems, therefore, probable that the essential feature of the decidua in the strict sense of William Hunter, viz., the membrane which develops to serve the needs of pregnancy, is, in the first place, the proliferation of the glandular elements for purposes of nutrition of the free ovum, the real decidua cells not being required until a later stage. Whether the swollen endometrial cells of the "menstrual decidua" may in some cases undergo some retrogression on the occurrence of pregnancy, as suggested by von Mollendorff, seems to me doubtful. If so, they soon advance again.

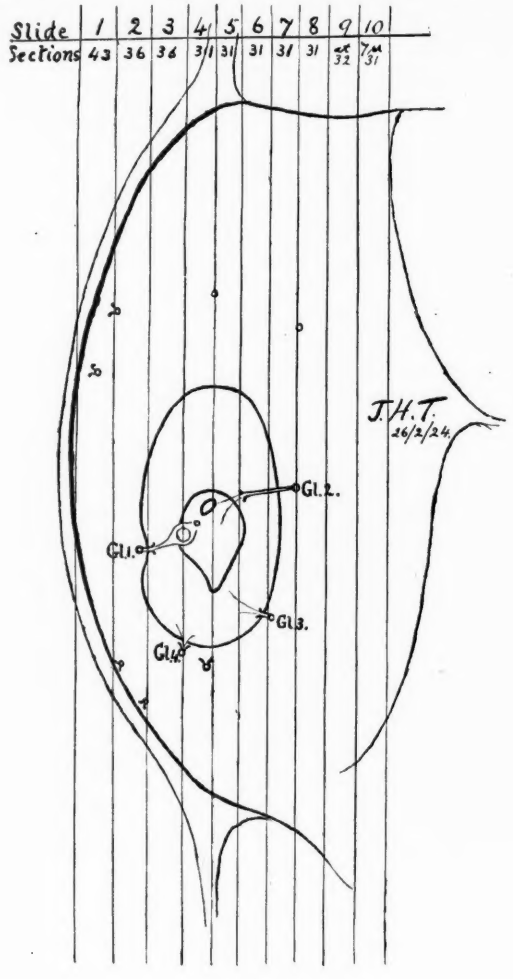
It seems to me possible that the greater development of them in the cases of his ovum "Sch." and T.B.1, which were fertilized towards the end of the menstrual cycle, as compared with older ova fertilized early in the cycle, is due to that difference, and can be explained on the supposition that in them the already well-developed cells of the pre-menstrual phase carried on without pause into young decidua cells.

Much has been written about the causes which bring about the implantation of the ovum and the character of the site at which it becomes implanted. The opinion of von Spee has been quoted. The determining causes of implantation doubtless are the attainment by the ovum of that stage of development in which the cells of the implantation pole become capable of penetrating into the maternal tissues and the necessity for a different mode of nutrition. Normally things would be so arranged that this would occur when the ovum was in the cavity of the uterus, and in the usual situation, viz., the upper part of that cavity. If this stage is reached before the attainment of the normal situation an extra-uterine embedding would result, and, on the other hand, if the ovum had travelled too fast and too far, implantation in the lower segment of the uterus and placenta prævia might result. This is well brought out by Johnstone, and illustrated by the circumstances of his second specimen which is embedded in the infundibulum of the Fallopian tube. "In the ovary removed along with the pregnant tube there is no recent corpus luteum. On the ovary of the other side there was observed at the time of operation what we took without hesitation to be a recent corpus luteum. The ovum must, therefore, have travelled from the one side of the uterus to the other. Further,

1. Glycogen is present in the uterine secretion of monkeys.—G. W. Corner.

assuming that it was fertilized on the surface of the ovary from which it arose and that the journey to the mouth of the opposite tube occupied several days, it is possible by the time it arrived at this point it was ready to implant itself." This is speculative, but it seems to us an extremely probable theory.

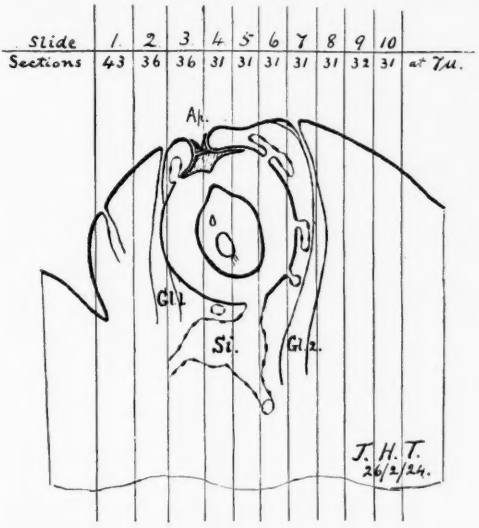
As regards embedding within the uterus, controversy principally concerns the question whether or not there is any physical character of the mucous membrane which determines the site of implantation; for example, whether the ovum becomes implanted in the mouth of



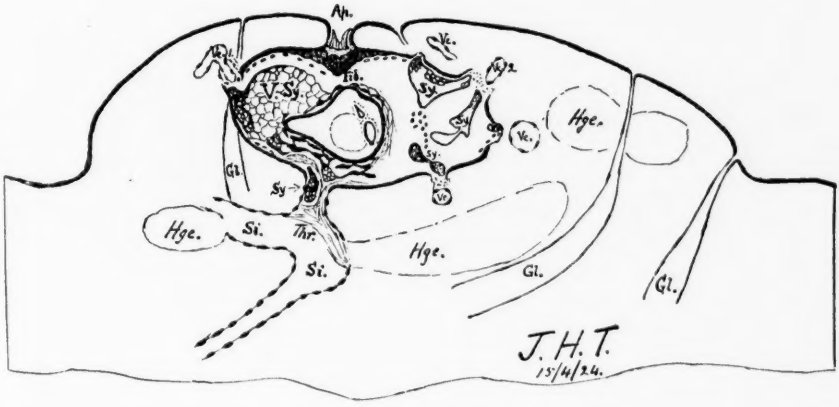
Text Fig. 3.

(For description of Text Figs. 3, 4 and 5, see p. 206).

a gland or whether it comes to rest in a furrow of the decidua. As Grosser has pointed out, the human ovum is far too large to enter the mouth of a gland which measures from 20 to 30 microns in diameter as against the 250 microns of the ovum even before fertilization. In the case of the ovum of Kleinhans the mucous membrane was smooth and free from furrows. Hitschmann and Lindenthal also have shown that the menstrual swelling does not



Text Fig. 4.



Text Fig. 5.

produce furrows in the endometrium like those which are seen in the decidua. The evidence, especially when extrauterine implantation is included, goes far to prove that there is no need for any special furrow, depression or lobule.

The ovum of Kleinhans, as shown in Fig. 5 of Grosser's memoir, is set squarely between the mouths of two glands, having been implanted in the surface between them. To investigate the relation of the ovum to the glands an attempt was made to reconstruct the whole lobule of decidua in which the original Teacher-Bryce ovum was implanted. This was found to be impracticable with reference to such small structures as glands and blood-vessels, but plans of the lobule (reproduced below as text Figs. 3 and 4) were prepared by plotting off the position of various structures on lines representing planes traversing the lobules through certain points. The spaces between the lines represent the thickness of all the sections on each microscopic slide of the series. This means roughly the combined thickness of 30 to 40 sections, as is shown in the figures. The text Figs. 3 and 4 show in horizontal plan and transverse section the results which were arrived at by plotting out the outline of the lobule, the outline of the implantation cavity and the outline of the blastocyst approximately in equatorial section, and as if they were on one plane and placing the other structures in relation to them as nearly as could be determined by direct measurement or by counting the number of sections. The plans are, therefore, rough graphic reconstructions and comparison with wax plate reconstructions certified that the relations were sufficiently accurate for the purpose in view. The figures are, therefore, really graphic reconstructions. The third plane is represented by the photomicrograph, Fig. 17 and text Fig. 5, which represents the various structures on one plane in the same manner as in text Figs. 3 and 4.

In the transverse section of the lobule, text Fig. 4, the aperture of entrance is seen to be close to the mouth of a gland, otherwise the picture resembles that of the ovum of Kleinhans.

Text Fig. 3 shows the aperture of entrance of T.B.1. to be situated near the apex of a triangle the angles of which are the gland mouths Nos. 1, 2 and 3. In the case of glands 1 and 2, the mouth on the side next the aperture of entrance is drawn out into a narrow fissure, the extent of which is indicated on the plan by the heavy lines terminating in a splay mouth. The lighter lines indicate that there was a tiny groove traceable from gland 1 to the aperture of entrance and beyond that almost without a break to the stretched out mouth of gland 2. Only in the very centre was this groove completely flattened out. My interpretation of the relation of the ovum to the two glands is as follows:—Gland No. 1 stands out slightly into the implantation cavity (as was mentioned in the original memoir)

having presented distinctly more resistance to the destructive activities of the trophoblast than the other tissues of the endometrium. (Actually it is not the gland but the layers of decidual cells ensheathing the gland which have presented the resistance.) The ovum, possibly taking advantage of the tiny groove which extends from the mouth of gland 1 to the mouth of gland 2, entered close to gland No. 1. Probably it burrowed vertically through the epithelium and superficial layers of decidua and then turned into the oblique position relatively to the aperture of entrance which is characteristic of the two Teacher-Bryce specimens and " Sch." of von Mollendorff, see Plate XV. Whether this is a characteristic obliquity dependent on the ovum or whether it is accidental and dependent upon the resistance of the gland causing the ovum to develop into the more easily penetrated endometrium towards the more distant glands, it is not possible to say.

Indications of similar relations to glands were found in T.B.2 and Johnstone's ovum, but so many glands have become involved in the extending capsularis and so much destruction of them has occurred that a clear picture could not be obtained. See text Figs. 1 and 2. The relations of the ovum and the glands in this phase of development require further study.

Summary.

Implantation of the human ovum and development of the trophoblast. Plate XV, Figs. 33 to 37. From analogy with comparative embryology it may be concluded that the human ovum is fertilized in the outer part of the Fallopian tube and reaches the uterine cavity in three or four days. There it lies, probably in little bays (not preformed) in the surfaces of the soft endometrium, nourished by the secretion of the uterine glands. Fig. 33.

About the tenth day after fertilization it attains a state of development when it must either enter the maternal tissues or perish. At this stage it is a small blastocyst showing a definitely bi-polar structure. Fig. 34. It then behaves like the ovum of the guinea-pig and attacks the endometrium and burrows into it by means of cytolytic activity of the extra-embryonic ectoderm at the implantation pole. The ectodermic cells of the opposite pole, which are last to enter, adhere to the uterine epithelium and close the breach. Later they grow out beneath the epithelium, uniting with the maternal tissues, and forming a closing apparatus which shuts off the implantation cavity from the cavity of the uterus. Fig. 35. Destruction of maternal tissue is probably limited in amount as in the hedgehog, and a close-fitting decidua capsularis is developed, as in Miller's ovum :—Fig. 36. A period of growth follows in which the relations

to the maternal organism continue to resemble those seen in the hedgehog, and a primitive or first generation of trophoblast is developed in which the two types of cell structure appear. Probably some reaction occurs limiting and controlling the growth of the ovum and nourishment is provided for by the opening of vessels and flowing of blood into the plasmoditrophoblast. At this stage doubtless the connexion with the great venous sinus is effected, which survives through the succeeding phase of destructive activity.

Figures not unlike the ovum of Miller occur among the early stages of the hedgehog, but nothing like T.B.1 :—Fig. 37. The behaviour of the embryo proper cannot be considered here, but it too seems already to have taken a strong line of its own. Fig. 35—37.

T.B.1 shows the destructive phase in full activity. The primitive plasmoditrophoblast or syncytium has excavated a relatively large implantation cavity with necrotic walls. The vacuolated syncytium, which is already commencing to degenerate, is the agent by which this was effected. The smaller masses of syncytium are now seeking for and opening the maternal blood-vessels, and the cavity becomes filled with blood, which, although extravasated, does not coagulate but drains into the large venous sinus. This marks the beginning of a circulation of blood round the ovum.

Probably towards the end of this period the blastocyst becomes detached from the operculum, and at the point of rupture thrombosis occurs in the implantation cavity and the " internal shield " of fibrin is formed to strengthen the capsularis at the aperture of entrance. The operculum would then degenerate and soon cease to be recognizable.

The operculum must be regarded as a special apparatus. It is not a part of the trophoblast, although it originates from the same tissue, as it does not exercise the functions which characterizes the rest of the extra-embryonic ectoderm. Neither is it a " Træger " in the sense in which that term is used in rodent embryology as it takes no part in the formation of the placenta.

The next stage is characterized by the growth of the secondary or permanent trophoblast which destroys the primitive syncytium and replaces the primitive cytotrophoblast. Destruction gives place to a more orderly process, the principal features of which are attachment of the ovum to the decidua and the quiet opening of blood-vessels and the formation of the intervillous space through which a circulation becomes established. In T.B.2 the rudiments of the chorionic vessels appear. Their development will be dealt with elsewhere by Dr. Donald McIntyre. As to the embryo, it may be repeated that its position in the blastocyst, as seen in the Teacher-Bryce specimens, is characteristic and of fundamental significance. It follows, therefore, that if other ova are searched,

keeping in mind the relations of the yolk-sac to the operculum, that structure should be found at any rate in specimens about the stage of Peters.

A number of other problems, such as the reckoning of the age of ova, and the relations of fertilization and implantation to the menstrual cycle, and the development of the decidua and the influence of the corpus luteum and ductless glands still await full investigation.

Conclusions.

(1) The human ovum burrows into the endometrium like a vigorous parasite destroying maternal tissue and provoking inflammatory and reparative reaction.

(2) The closure of the decidua capsularis (reflexa) is effected by an apparatus developed from the last entering cells of the ectoderm of the ovum. This becomes united with the uterine epithelium and later with the other tissue of the lips of the aperture of entrance. For it the term "operculum deciduæ" is suggested.

(3) The recognition of this apparatus has led to the discovery that in the human ovum there is a polar structure similar to that seen in the guinea-pig and hedgehog. The ovum is therefore described as having an entering or implantation and an adhering or closing pole. This polarity determines the position of the embryonic rudiment in the blastocyst and the situation of the placenta. The operculum differs from the Træger of the rodent in taking no part in the formation of the placenta.

(4) The operculum usually becomes detached from the blastocyst and degenerates when its functions of closure of the aperture of entrance and temporary fixation of the ovum have been fulfilled. When the separation occurs, an "internal shield" of fibrin is formed by thrombosis in the implantation cavity and closes the aperture of entrance from within. In some cases the operculum remains attached to the blastocyst and an external "closing coagulum" (Gewebspilz) may form over it.

(5) The conception (1908) that there are two generations of trophoblast (a primitive or implantation trophoblast and a secondary or attaching or placental trophoblast) is found to be justified.

(6) Much of the syncytial part of the primitive trophoblast disappears when its functions of forming the implantation cavity and opening the maternal vessels have been discharged.

(7) The rest of it and the primitive cytotrophoblast develop into the placental trophoblast, and, in the first place, are concerned with the attachment of the ovum and the formation of the intervillous

space and proper channels between it and the maternal circulation, eventually becoming the chorionic epithelium.

(8) The original Teacher-Bryce Ovum (T.B.1) is found to demonstrate the relations of the maternal blood to the ovum prior to the formation of the intervillous space. The blood enters the implantation cavity as hæmorrhages from minute vessels of the endometrium and leaves it by the large venous sinus which is so conspicuous an object underneath most young human ova. This sinus must be regarded as a normal feature of the surroundings of the young human ovum. Abortion in the case of T.B.1 appears to have been due to rupture of the sinus followed by thrombosis which arrested the circulation through the implantation cavity.

(9) In these early arrangements the human ovum exhibits fundamental differences from the ovum of any other species, the early development of which is known.

On account of the rarity and beauty of the objects dealt with in this communication it seemed fitting that the illustrations should be abundant and of fine quality. I have much pleasure in expressing my indebtedness to the Carnegie Trust of the Universities of Scotland for a grant in aid of research which has made it possible to carry this out on a lavish scale.

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DESCRIPTION OF PLATES.

Plate 1, Fig. 1. Teacher-Bryce Ovum No. 2.

The uterus laid open in front showing the lobule in which the ovum was imbedded situated in the left upper quarter of the posterior wall. The left ovary contains a large corpus luteum. Inset is the lobule enlarged to about four diameters. Drawn by A. K. Maxwell.

Plate 2, Fig. 2. Teacher-Bryce Ovum No. 2.

The lobule enlarged to about ×15. This should be examined along with text Figure No. 1 on page 174.

The text figure shows the principal structures in outline as they appeared during clearing in xylol. The landmark is the oval blood clot (marked "clot"). The cross beside it indicates the centre of the aperture of entrance and operculum. The area enclosing the cross represents the extent of the adherent cone of blastocyst. The operculum is considerably more extensive. The oval bodies below it are the ends of chorionic villi and the dark bodies show the masses of uncleared blood in the superficial vessels. The clear

area of the figure represents fairly accurately the avascular decidua capsularis. Gl. 1 and Gl. 2 indicate the nearest glands. Both figures drawn by A. K. Maxwell.

Plate 3, Fig. 3. Teacher-Bryce Ovum No. 2. × about 21.

General view of the whole ovum in Section 26.1.1. In the cavity of the blastocyst are seen the amnio-embryonic rudiment and yolk-sac. Ap.e. Aperture of entrance occupied by the operculum cut considerably to one side of the centre. The section for purpose of the drawing was projected without an eye-piece. Consequently the drawing is reversed from the usual microscopic picture which is shown in the photomicrograph Fig. 4. Drawn by A. K. Maxwell.

Plate 4, Fig. 4. Teacher-Bryce Ovum No. 2. × about 25.

Photomicrograph of Section 28.2.2 for comparison with the drawing. This section passes through the centre of the operculum. Only the yolk-sac appears in it.

Note the tearing of the blastocyst wall from the blood of the intervillous space close to the operculum, the coagulum and its situation at the dependent aspect of the blastocyst (dorsal decubitus of body) and the large venous sinus below the ovum. Photograph by J. H. T.

Plate 5, Fig. 5. Teacher-Bryce Ovum No. 2.

One half of the operculum (Op.) in Section No. 25.2.1. × 350. The mesoderm (mes.) is retracted from the base of the operculum. Ch. ep. The chorionic epithelium which becomes more primitive in character with nuclei of irregular shape and size as the operculum is approached.

The cells and nuclei of the operculum are large and vary in size and shape. Those further from the blastocyst wall show signs of degeneration. There is some vacuolation of their protoplasm and a few leucocytes are seen among them. The thin membrane with small elongated nuclei on the surface of the operculum is the remains of the uterine epithelium—ut.ep. Note the different size of the cells of the two structures. Between the operculum and the chorionic epithelium covering the blastocyst there are remains of decidua, thrombus-like material with many leucocytes and the blood in the intervillous space—i.v.sp. The pale granular masses in the blood occur frequently throughout the intervillous space. I am not prepared to make a definite statement as to their nature. Compare Fig. 7 and Photos Figs. 8 to 10. Drawn by A. K. Maxwell. Scale : hundredths of millimetre.

Plate 6, Fig. 6. Teacher-Bryce Ovum No. 2.

The operculum in Section 28.2.2. × about 120. It shows the broad, flat and the tearing of the specimen by the air bubble. Ch.ep. Chorionic epithelium.

Sy. Portion of syncytium which is also seen in Fig. 9, apparently separating the blastocyst from the operculum. V. Villus.

Ut. ep. Remains of uterine epithelium passing in over the surface of the operculum. Compare Figs. 8 to 10, photographs. Drawn by A. K. Maxwell.

Fig. 7. Dr. Johnstone's Ovum No. 1. (Uterine.)

The decidua capsularis showing the remains of the operculum (op.) in Section 18.2.5. × 320. The blood corpuscles indicate the inner aspect of the decidua. The operculum is seen as a well defined structure with dark shrivelled nuclei occupying a space in the remains of the decidua. The solid looking mass (fi.) on the inner aspect is part of the internal shield of

fibrin. Compare text Fig. 2, p. 182, and Fig. 11, photograph. Drawn by A. K. Maxwell. Scale : hundredths of mm.

Plate 7, Fig. 8. Teacher-Bryce Ovum No. 2.

The operculum and cone of blastocyst in Section 28.2.2. × about 80. For comparison with Fig. 6. Sy. Primitive syncytium. Mes. Mesoderm of blastocyst. Op. Centre of the operculum. Photograph by J. H. T.

Fig. 9. Teacher-Bryce Ovum No. 2.

One half of the operculum with adjacent structures to show the long-pointed end of a mass of primitive syncytium (Sy.) stretching in between the operculum (op.) and the wall of the blastocyst. × 156. Photograph by J. H. T.

Fig. 10. Teacher-Bryce Ovum No. 2.

The lower edge of the operculum in Section 28.2.2. × about 360. Op. The end of the long sprawling cells imbedded in the decidua. D. A decidua cell lying between it and U.E. remains of the uterine epithelium.

Note the thin coagulum overlying the three well preserved epithelial cells. Photograph by J. H. T.

Fig. 11. Dr. Johnstone's Ovum No. 1 (uterine).

Decidua capsularis and margin of the trophoblast showing the remains of the operculum (op.) in Section 18.1.5 × about 150. Photograph by J.H.T.

Plate 8, Fig. 12. Teacher-Bryce Ovum No. 2.

A blood vessel of the decidua capsularis opening into the intervillous space. Section 47.1.5 × 270. The vessel, although it appears to enter vertically, really lies obliquely to the implantation cavity, the section being almost tangential. The cytotrophoblast is seen in contact with the maternal blood. About the centre of the picture two endothelial cells are seen separated from the decidua by cytotrophoblast which has grown along under it and replaced it.

Compare the necrotic layer of the decidua with the pictures of T.B. 1. Compare Fig. 15, photograph. Drawn by A. K. Maxwell Scale : hundredths of mm.

Fig. 13. Teacher-Bryce Ovum No. 2.

The mouth of a blood-vessel communicating with the intervillous space. Section 36.2.2. × about 120. Scale : hundredths of mm.

On both sides of the mouth the syncytium is seen in continuity with the endothelium which is practically perfect. In some sections there is a small area of degenerate tissue between the lower mass of syncytium and the endothelium.. Over all it is nevertheless clear that the syncytium does not originate from the maternal endothelium. Drawn by A. K. Maxwell.

Plate 9, Fig. 14. Teacher-Bryce Ovum No. 2.

The decidua capsularis, trophoblast and villi in Section 21.2.5. × 156.

The figure shows the border between the fully living and the degenerating decidua and the necrotic inner zone of the decidua like in T.B. 1. The ends of two villi are seen. The cytotrophoblast nearer to them is edged with syncytium. Further out it may lie naked to the maternal blood. Masses of primitive syncytium are seen and above them is a blood vessel (Ve.) which has almost been opened by syncytium as in T.B. 1. The serial sections show that actually it has not been opened. The area is shut off from the implantation cavity by thrombosis. Photograph by J. H. T.

Fig. 15. Teacher-Bryce Ovum No. 2.

Decidua capsularis at one side of the ovum showing the characters of the decidua and the blood vessel (Ve.) shown in Fig. 12, Plate 8. Section 47.1.5. × 156. Photograph by J. H. T.

Plate 10, Fig. 16. Teacher-Bryce Ovum No. 1.

Section 3.5.3. × 340. The aperture of entrance filled by the remains of the operculum (op.) and some thrombus-like material. Beneath this is seen the internal shield of fibrin (i.s.) with a conical point stretching down almost to the blastocyst. The wall of the blastocyst shows the primitive syncytium (plasmoditrophoblast) sy. and the cytotrophoblast (cy.tr.). Along the junction between the two there are signs of degeneration and some dead material. On the right of the conical point of the internal shield of fibrin a mass of syncytium (Sy.) which is attacking and dissolving the fibrin. Compare Figs. 20 and 21, Plate 12. Drawn by A. K. Maxwell. Scale: hundredths of mm.

Plate 11, Fig. 17. Teacher-Bryce Ovum No. 1.

The whole ovum in Section 4,2,4. × 40. General view showing the decidua capsularis with necrotic zone next the blood in the implantation cavity and the various tissues of the ovum. Compare text Fig. 5.

Y.S. The yolk-sac is seen towards one side of the blastocyst imbedded in the mesoderm. Right above it is the bulge of the blastocyst wall which is supposed to have been the site of the operculum.

On the left the implantation cavity is occupied by a mass of spun-out spongy syncytium. On the right the spent remains of this are seen flattened against the blastocyst and further out is a line of liberated decidua cells which have been driven towards the middle of the cavity by an inrush of blood. Compare Fig. 24, Plate 13. Photograph by J. H. T., 1908.

Fig. 18. The aperture of entrance (Ap.) occupied by remains of the operculum. Section 4.5.4a. Gram-Weigert's fibrin stain. × 156.

I.S. Internal shield of fibrin with a layer of liberated decidua cells below it. Mes. Mesoderm. Sy. Mass of vacuolated syncytium. Photograph by J. H. T.

Fig. 19. Portion of the blastocyst in Section 4.4.6. × 156 to show.

A.E. The amnio-embryonic sac which is torn. In the photograph masses of deposit from the hæmalum complicate the picture. Also shows the mesoderm, cytotrophoblast and the syncytium (plasmoditrophoblast). Photograph by J. H. T.

Plate 12, Fig. 20. Teacher-Bryce Ovum No. 1.

Part of the decidua capsularis showing a stage in the opening of maternal blood vessels by the ovum. Section 3.3.2. × 210. On the left there is living decidua with blood vessels. In the centre the endothelial tube of a small blood vessel is seen dissected out from the surrounding decidua, some of the cells of which lie more or less free in the cavity around it. Below there is a mass of young syncytium adhering to the necrotic layer of decidua. To the right and higher up is seen the spent syncytium with its vacuoles full of blood. Between this and the decidua the solution of the necrotic layer and liberation of the decidua cells into the implantation cavity can be seen. Drawn by A. K. Maxwell.

Fig. 21. Opening of maternal blood vessel. Section 2.5.2. × about 290.

In the centre is seen a small blood vessel running round the margin of the implant tion cavity. There is a gap in the necrotic layer of the decidua

which is filled with blood and two masses of syncytium, one of which is seen pressing into the endothelial wall of a capillary. To the right of it the capillary appears to have been opened and the aperture and the lumen of the capillary are occupied by a small thrombus. The blood in the gap differs in appearance from that in the implantation cavity. Compare photographic Figs. 23 and 25. Drawn by A. K. Maxwell.

Plate 13. Teacher-Bryce Ovum No. 1.

Fig. 22. Decidua and implantation cavity at lower end in Section 3.3.2. × about 125, for comparison with Fig. 20.

In the centre is seen the endothelial tube of a small blood vessel filled with thrombus. The decidua and necrotic zone around it appear to have been dissolved. The character of the decidua is well shown. Compare Fig. 14 of T.B. 2, Plate 9. Photograph by J. H. T.

Fig. 23. End of implantation cavity in Section 2.5.2. × 125, for comparison with Fig. 21 and to show three openings of maternal blood vessels. The necrotic layer appears to have been dissolved at each of these.

The dark strands in the blood are mostly remains of the vacuolated syncytium. Photograph by J. H. T. Compare text Fig. 5 on p.

Fig. 24. The mouth of the venous sinus with part of the blastocyst. Section 5.4.3. × 125. From a section near that figured in Plate V, Fig. 5, of 1908 Memoir.

Mes. Mesoblast.

Tr. The cytotrophoblastic wall of the blastocyst.

Sy. Mass of primitive syncytium hanging down into the sinus.

Thr. The thrombus in the sinus.

Compare the text Fig. 5, p. 205, for the position of the rupture of the sinus and the hæmorrhage. Photograph by J. H. T.

Fig. 25. Margin of implantation cavity in Section 4.4.5. × 125.

To show a wide gap in the necrotic layer and hæmorrhage into the cavity on either side of a large mass of primitive syncytium. The released decidua cells are driven towards the blastocyst by the inrushing blood. Photograph by J. H. T.

Plate 14, Fig. 26.

Ovum of guinea-pig at an early stage of implantation. It has destroyed an area of the uterine epithelium and is commencing the attack upon the underlying tissue. The embryonic mass is attached to the pole of the ovum which is the last to enter. v. Spee, Fig. 7, Pl. 1, reduced to about × 400.

Fig. 27. Ovum of guinea-pig implanted in the endometrium and surrounded by a considerable area of degenerate maternal tissue and a cavity (H) which was filled with " a very thin emulsion " (v. Spee, p. 161, line 31). Ue. The uterine epithelium is seen in contact with (but they were sharply defined from) the last entering cells of the ovum. P. "Placentarpol " and p. l. " Implantationspol."

The site of imbedding at one side of the slit-like cavity of the uterus is more usual than that shown in the next figure. v. Spee, Fig. 11, Plate VIII.

Fig. 28. Ovum of guinea-pig implanted and attached to the uterine epithelium by the " Placentarpol." Around it there is a relatively large cavity (H) lined by necrotic tissue outside which the cells of the endometrium are swollen and closely packed against one another. Note the

separation of the uterine epithelium from the other maternal tissues and its adhesion to the ovum.

As. Cells in early stage of degeneration. C. Capillary. Y. The embryonic mass of cells. P. l. The "Implantationspol." U. Cavity of uterus. v. Spee, Fig. 13, Plate X.

Fig. 29. The ovum of the hedgehog at the commencement of implantation. The cells of the implantation pole, with which goes the embryonic mass, are destroying the uterine epithelium.

b.e. bouton embryonaire (embryonic ectoderm). en. endoderm. ep. uterine epithelium. tr. trophoblast. v. blood vessels of decidua.

da Costa, text Fig. 13.

Fig. 30. The ovum of the hedgehog (*Erinaceus europæus*) at an early stage of implantation. It consists of a thick outer shell of elongated darkly stained cells (the trophoblast) with a knob projecting inwards (the embryonic ectoderm) and a thin-walled lining to the cavity (the endoderm "hy.") The outer pole lies bare to the clot (coa) which fills the space between the lips of the decidual swellings. Hubrecht, Fig. 39, much reduced.

Fig. 31. The ovum of the hedgehog implanted in a groove between great decidual swellings, the lips of which are glued together by a mass of blood clot. Resink, Fig. 1.

Fig. 32. The ovum of the hedgehog showing the bare outer pole, its relation to the uterine epithelium, the trophoblast and the uterine vessels communicating with spaces in it. Resink, Fig. 3.

Plate 15. Diagrams illustrating the Implantation of the Human Ovum.

All the figures are magnified by about 70. The embryonic rudiment is proportionately too large.

Ap. e. Aperture of entrance.
G_1 G_2. Uterine glands corresponding to Gl. 1 and Gl. 2 in text fig. 3.
Is. Internal shield of fibrin.
Op. Operculum.
Si. Mouth of venous sinus below ovum.
Ue. Uterine epithelium shown by black line.
Ve. Small blood vessels at periphery of implantation cavity.

Fig. 33. The human ovum free in the uterus. Its shape is oval and the longest diameter is taken as 0.30 of a millimetre.

Fig. 34. The human ovum passing through the epithelium into the endometrium. The embryonic mass goes with the implantation pole. Note the larger size of the cells at the opposite pole.

Fig. 35. The human embryo possibly about 24 hours after implantation which is taken as commencing on the tenth day after fertilization. There has been considerable growth and the endoderm and mesoderm have appeared. The large cells at the closing pole have multiplied and spread underneath the epithelium forming the operculum to the centre of which the epithelium it attached. Expansion is occurring in the direction of G. 2. and the embryo is assuming the characteristic oblique position.

Fig. 36. The human ovum in the stage of Miller or Kleinhans, possibly about 48 hours after implantation. The operculum has grown considerably. It is still attached to the blastocyst. The differentiation of the trophoblast into the two layers has taken place and the syncytium forms an irregular

Plate 1. Fig. 1.

Plate 2. Fig. 2.

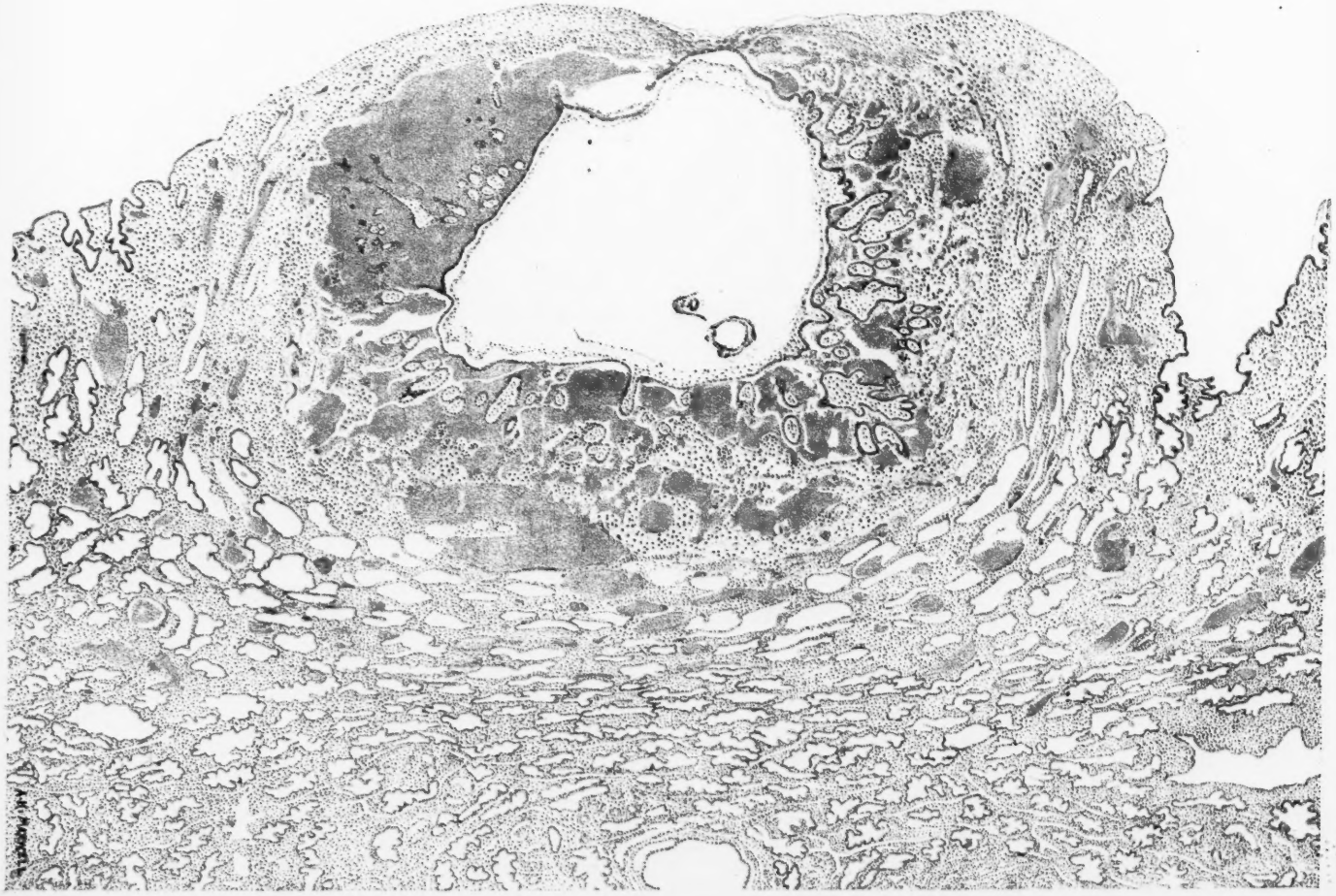


Plate 3. Fig. 3.

Plate 4. Fig. 4.

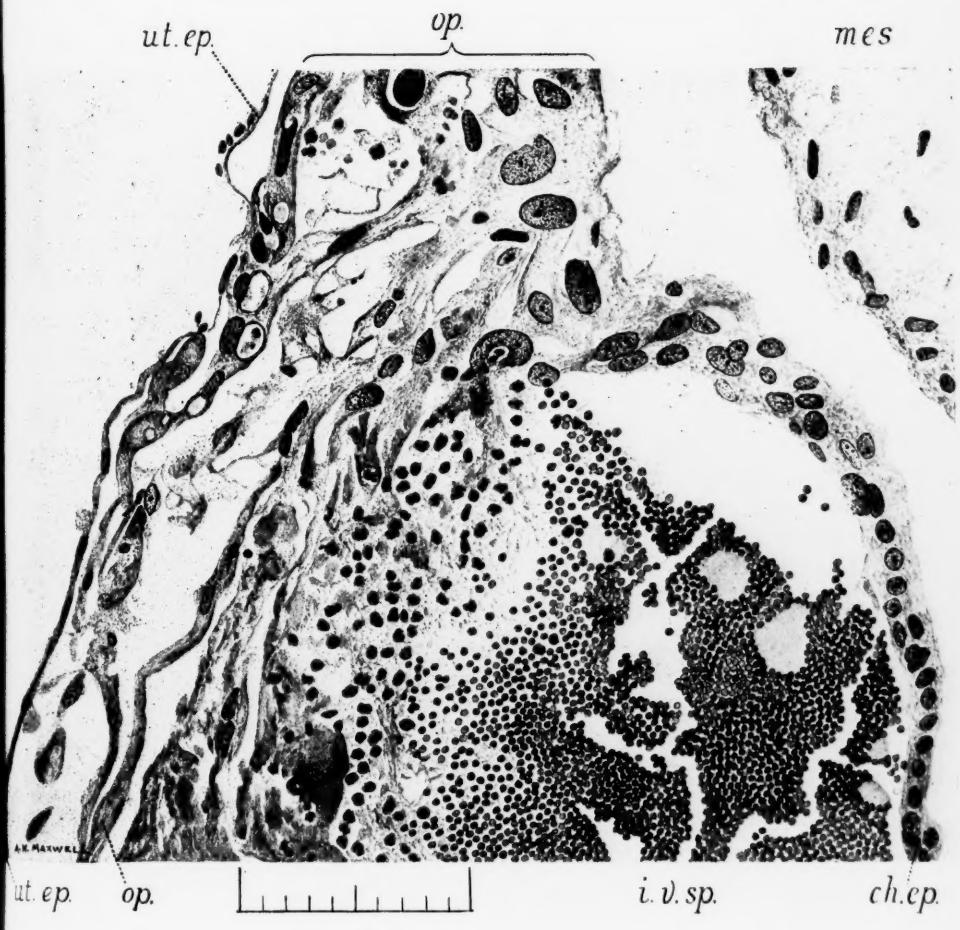


Plate 5. Fig. 5.

Fig. 6.

Fig. 7.

Plate 7.

Fig. 8.

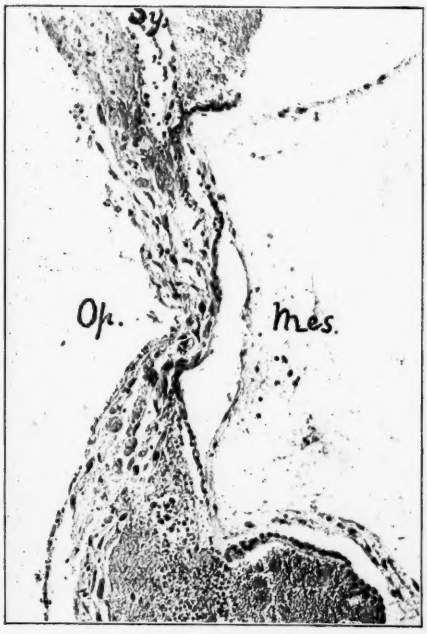


Fig. 9.

Fig. 10.

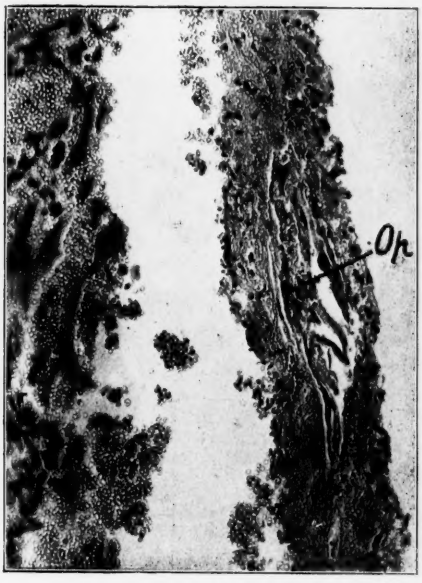


Fig. 11.

Plate 8.

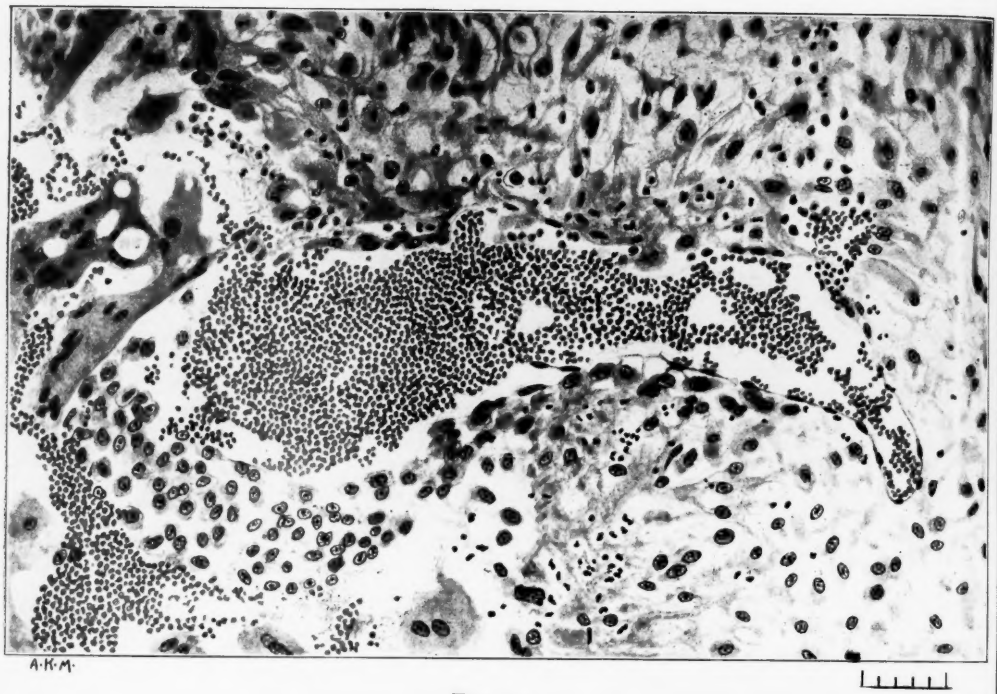


Fig. 12.

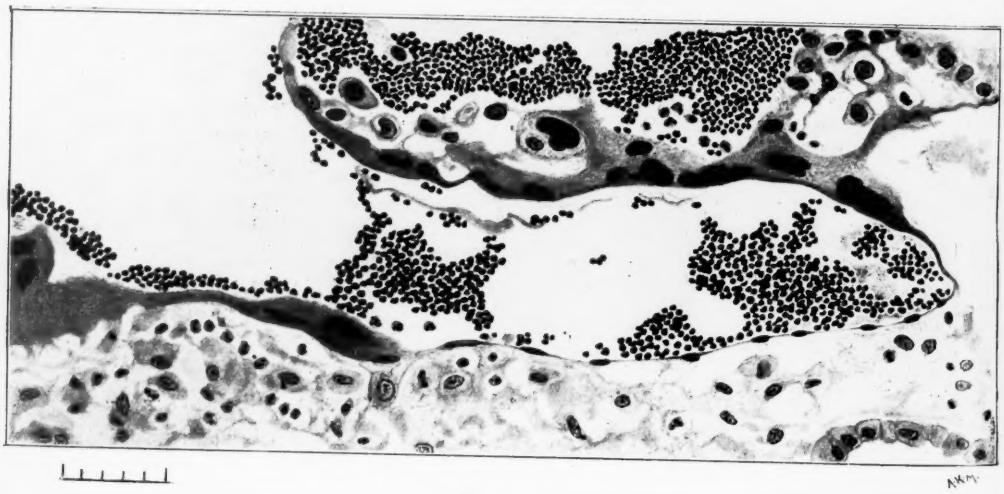


Fig. 13.

Plate 9.

Fig. 14.

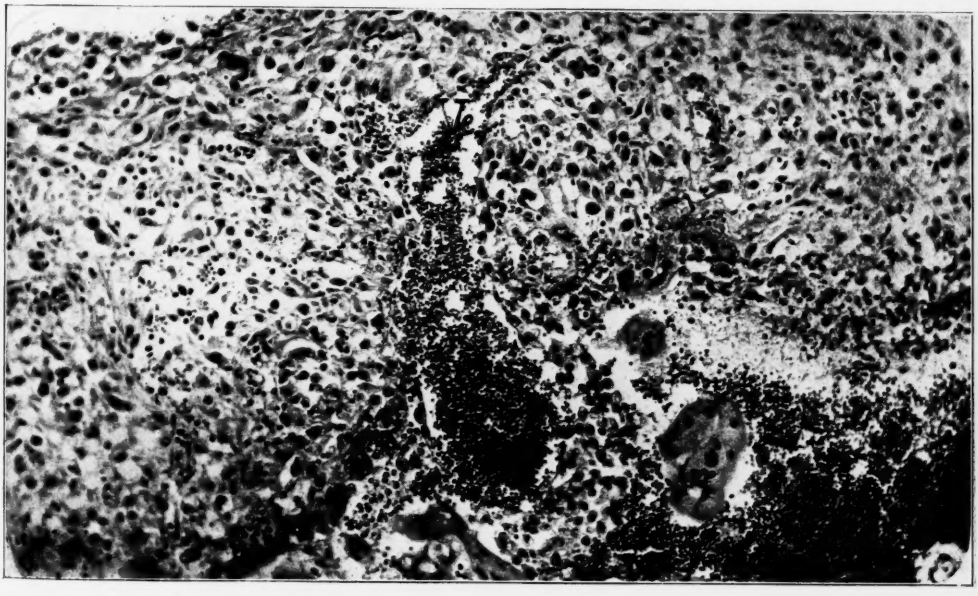


Fig. 15.

Plate 10. Fig. 16.

Plate 11.

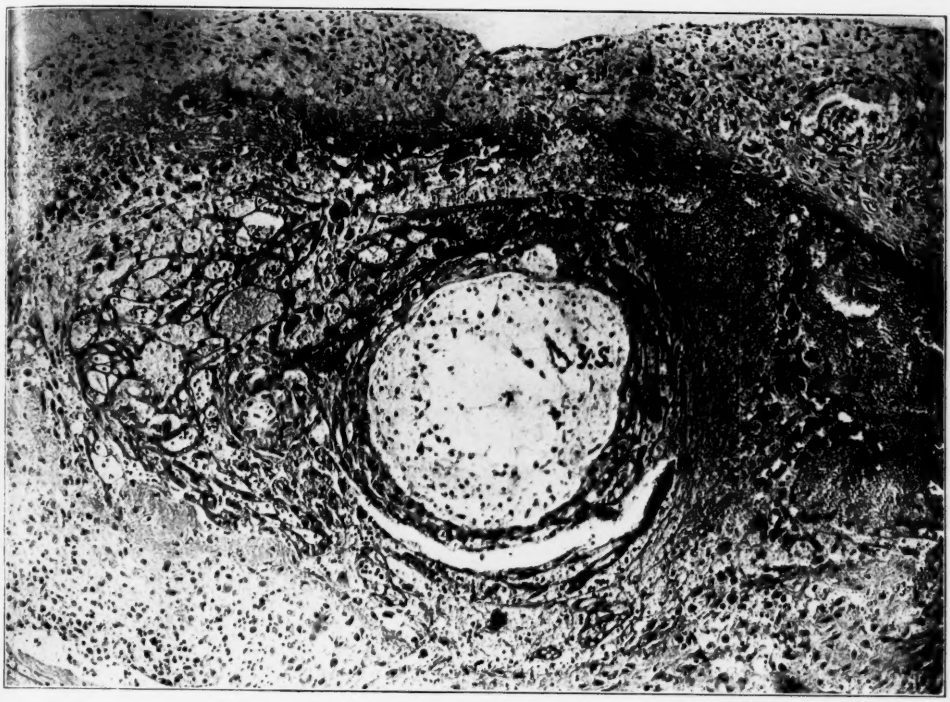


Fig. 17.

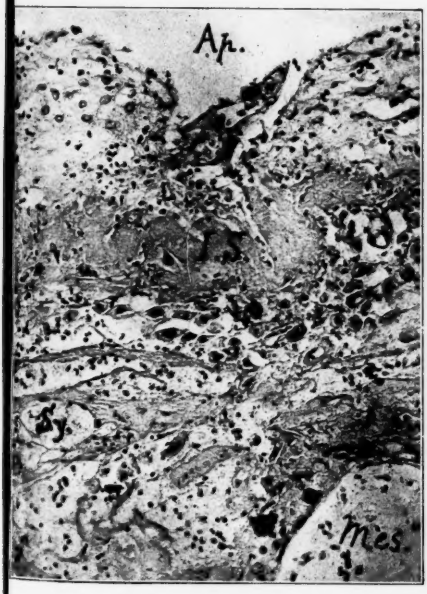


Fig. 18

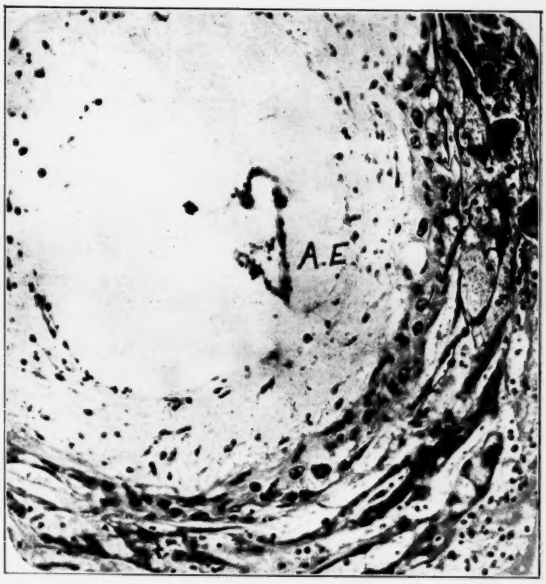


Fig. 19.

Plate 12.

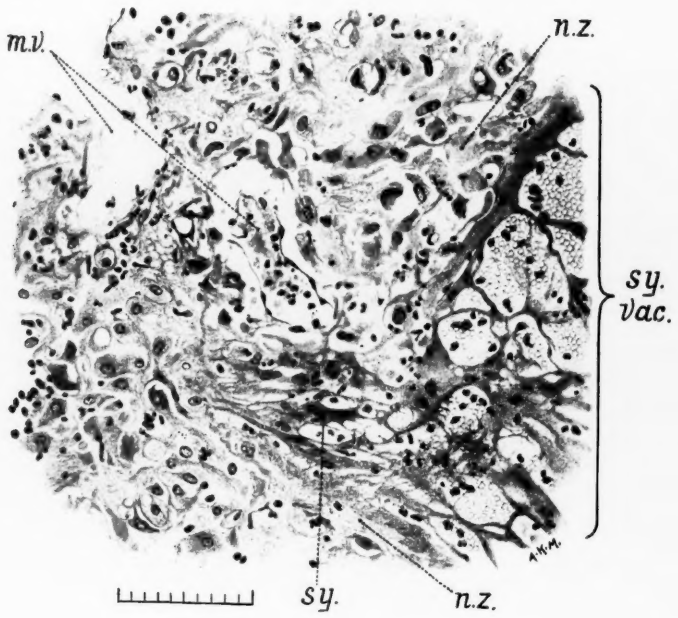


Fig. 20.

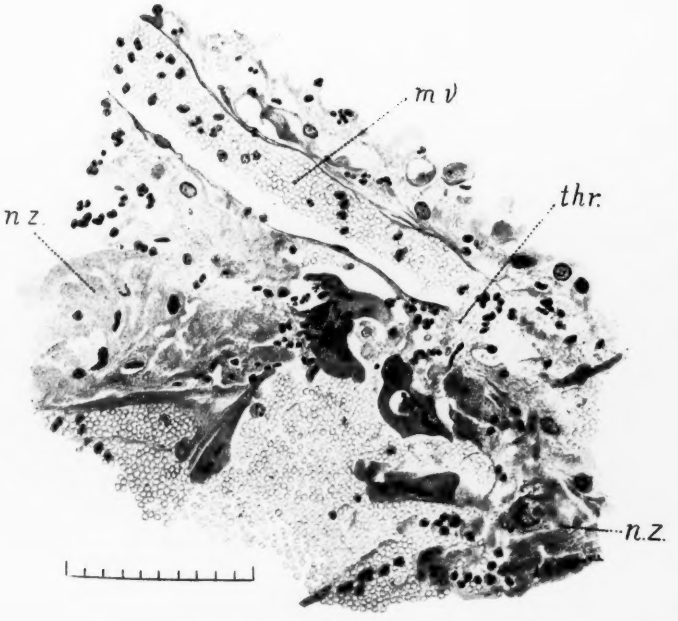


Fig. 21.

Plate 13.

Fig. 22.

Fig. 23.

Fig. 24.

Fig. 25.

Plate 14.

Fig. 26.

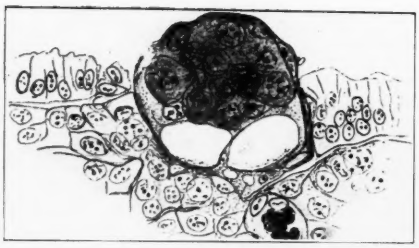


Fig. 28.

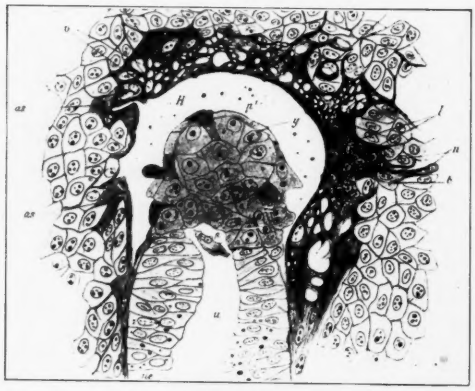


Fig. 29.

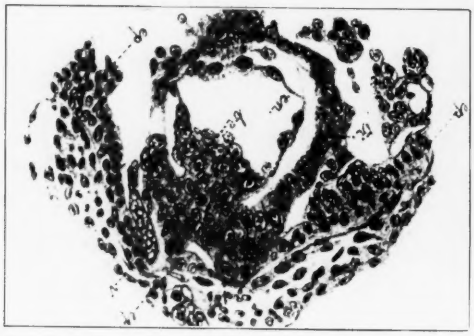
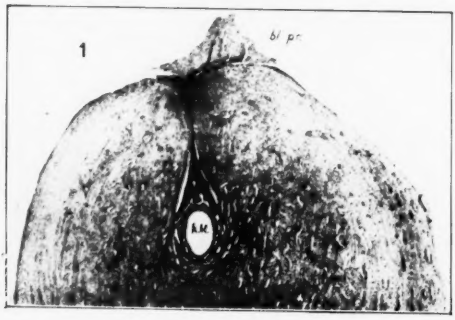


Fig. 31.



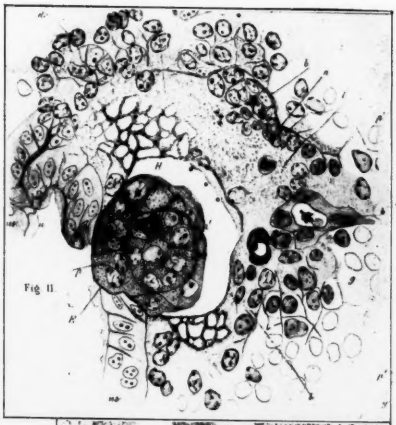


Fig. 2

Fig. 3

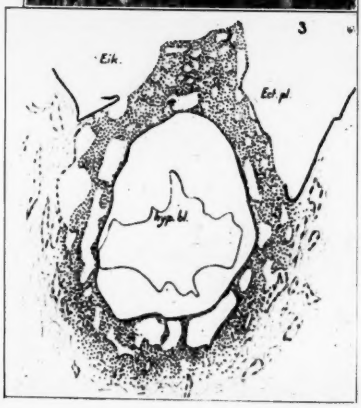
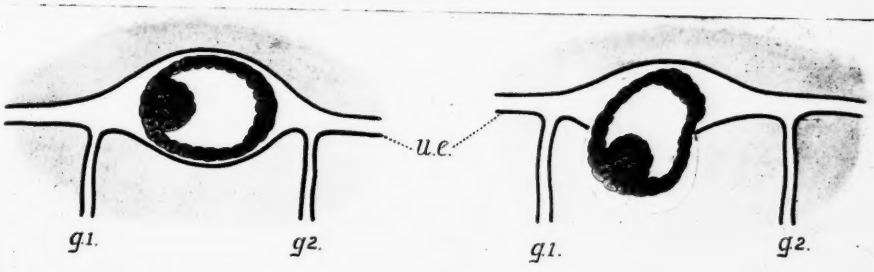
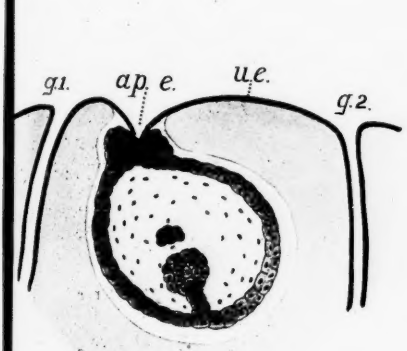


Fig. 3

Fig. 33.

Fig. 34.





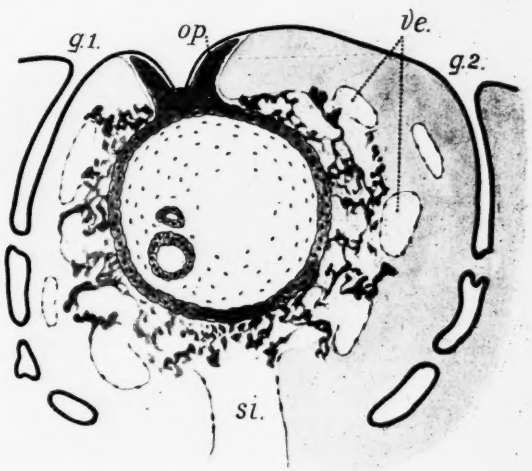


Fig. 36.

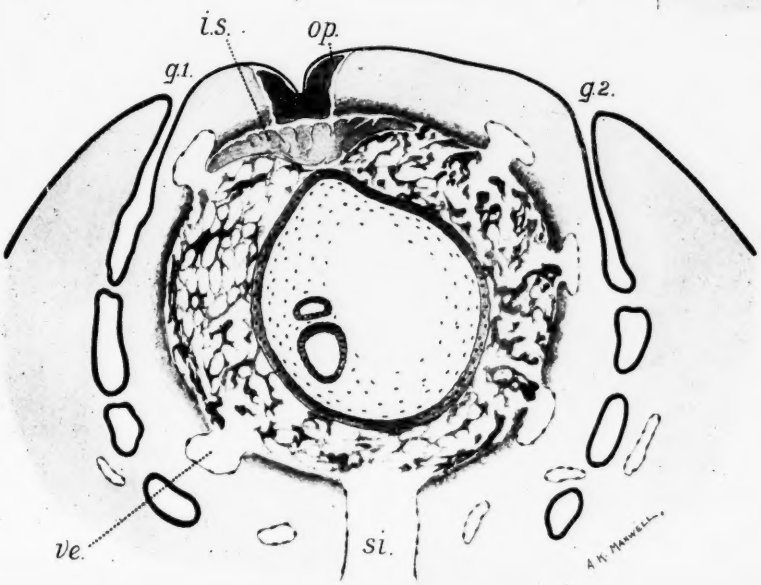


Plate 15. Fig. 37.

sponge work. Small maternal blood vessels have beeen opened and blood has flowed into the spaces of the trophoblast. The orifice of the great sinus underlying the ovum has been established. The decidua fits closely round the ovum and there is no necrotic zone.

Fig. 37. The human ovum in the stage of T.B.1., possibly 72 hours after implantation and towards the end of the destructive phase. On the left of the implantation cavity the vacuolated syncytium which excavated the cavity is seen. On the right the condition is more that of masses of syncytium which are opening the blood vessels. The necrotic zone is fully developed. The large sinus has remained unaltered. The operculum has become detached and the internal shield of fibrin has formed to close the gap in the decidua which might have arisen.

TEXT FIGURES.

Text Fig. 1, p. 174. Teacher-Bryce Ovum No. 2.

Lobule (× about 20) in which T.B.2. was imbedded, drawn after clearing in xylol to show the blood vessels, etc. See description of Fig. 2, Plate 2. Drawn by A. K. Maxwell.

Text Fig. 2, p. 182. Dr. Johnstone's Ovum No. 1. × about 6.

Outline traced from photograph of Section 17.2.5. A.E. Amnio-embryonic vesicle with yolk-sac to right. Blastocyst with villi heavily outlined. Gl. 1 and 2 remains of glands in the decidua capsularis. Op. The edge of the operculum. Ve. Vessels in decidua basalis. Drawn by J. H. T.

Text Fig. 3, p. 204. Teacher-Bryce Ovum No. 1.

Surface plan of the lobule of decidua reconstructed from the sections × 20. The spaces between the lines represent the total thickness of the sections on each slide with the extra sections from the " series at intervals" preparation added.

Gl. 1, 2, 3, 4. Mouths of glands in close relationship to the implantation cavity. The straight lines and splay mouths indicate that the glands have been stretched over the growing ovum. The faint lines passing from Gl. 1 to Gl. 2 indicate a shallow groove. The light circle near Gl. 1 shows the position and size of the aperture of entrance. The heavily outlined pear-shaped area represents the blastocyst enclosing the two vesicles also heavily outlined. The oval one is amnio-embryonic. Drawn to scale by J. H. T.

Text Fig. 4, p. 205. Teacher-Bryce Ovum No. 1.

Transverse section (× 20) of the lobule reconstructed from the sections and showing the structures as if they lay on one plane.

Ap. Aperture of entrance filled by the operculum with the internal shield of fibrin below it. Gl. 1, Gl. 2. Glands as in text Fig. 3. Si. The great venous sinus beneath the ovum. Round the periphery of the implantation cavity small vessels are shown as if in free communication with it Drawn to scale by J. H. T.

Text Fig. 5, p. 205. Teacher-Bryce Ovum No. 1.

Diagrammatic section of the lobule and ovum as profile view for comparison with text Figs. 3 and 4 and Figs. 16 to 25. For general view see Fig. 17 and its description. × 20.

Ap. Aperture of entrance with operculum. Fib. Internal shield of fibrin Gl. Gland. Hge. Hæmorrhage. Si. Venous sinus with Thr. thrombus extending from the rupture. Sy. Syncytium. V. Sy. Vacuolated syncytium. Ve. Maternal arterial capillaries. Ve 1. Corresponds to Figs. 20 and 22. Ve 2. Corresponds to Fig. 24. Drawn to scale by J H. T

Obstetric Teaching—A Live Method.

By V. B. Green-Armytage, M.D., M.R.C.P. (Lond.), I.M.S.,
Second Professor of Midwifery and Gynæcology, Calcutta Medical College; Second Surgeon to the Eden Hospital for Women, Calcutta.

The research work of Eardley Holland on the Intracranial stresses of the Fœtal Skull, and the "Schwangerschaft und Geburt in Röntgenstrahlen" of Warnekros, have thrown a new light on our conception of the mechanics of labour, and what perhaps is more important, have illuminated those principles of obstetrics which were discussed at the Section Meeting of the B.M.A., 1923, as a result of the Address of Comyns Berkeley.

The proper teaching of obstetrics is an Imperial matter, and to-day it is of even more importance, for the contraceptive propaganda of the Marie Stopes school is spreading East and to our Colonies. No gynæcologist finds fault with the gospel of quality before quantity, but the means advocated undoubtedly is a boomerang which shakes not only the foundations of Sociology but undermines the health, morale and equable happiness of married life. All practictioners are not gynæcologists, but all practitioners would do well to ponder over the psychological aspect of modern man and woman as wisely depicted by Ludovici, in his recent book "Woman," before lightly prescribing the last of the Stopes School publications; anyhow, whatever be our attitude to this question, argued though it be from the moral or economical aspect, it is the bounden duty of the profession to ensure the safe advent of the first infant, for, rightly or wrongly, it may be the last or the last but one.

The old attitude of muddling through without forethought and in entire ignorance of what is happening or what not to do, is therefore reprehensible. The onus and responsibility indirectly lie with the teachers, and on them it depends whether the maternal and infantile mortality and morbidity shall decrease, whether vaginal fistulæ shall become rare, and the tale of one child sterility, chronic invalidism, and prolapse shall become exceptional.

The preventable misery seen in the out-patient department of every hospital and dispensary throughout the Empire, directly due to ignorance or lack of antenatal care, is heartrending, for we must admit that the greater part of this misery is the result of the inept

mental absorption of nurses and students and post graduates. The major points, such as measurements, urine testing, the toxæmias and the principles of diagnosis and practice are taught *ad nauseam*, it is true, but how often do they bear good fruit? Why so often is bedside diagnosis a riddle, and treatment a nightmare of doubt? Why is this? Is it not because the teaching has not been alive and clinical? Books and lecture diagrams give no lasting visual or tactile memory; hands are unpractised and have learned no cunning; judgment is harried by friends, and parrot-preached principles of treatment fly out of the window in the presence of relatives and patient. How much more then is the fog and temerity of those who are called at the last moment, or when things are going wrong. They grope, they struggle, they do their best, but often it is a poor best, for they have no visual memory of how, or where, or what is happening; oftentimes two lives hang in the balance, counterpoised perhaps by brute force and ignorance.

To obviate the old deficiencies in teaching and make the subject alive and interesting and not a matter of dull dummies, mannekins and mechanical contraptions, I have tried taking batches of 20 students at a time for six weeks during the past 12 months. Each batch attends daily in the morning for six weeks. One hour is devoted to clinical gynæcology and one hour to clinical obstetrics.

In order to instil interest into the teaching of obstetrics my method is as follows:—

A specially made large female dummy is taken and lined with a clean, warm, turkish towel, and in this is placed, shortly after it has been nursed, any recently born baby up to 10 days old. One by one the different presentations of the fœtus *in utero* are taken up, the mechanism of labour is demonstrated, and the complications and treatment are gone over. The student grasps and his memory sees what occurs. The movements of the live child just clothed in a light vest impart life and realism. He can see how a cord (a length of red tape sewn to the vest) descends and the hand comes down beside the head at times. He learns the object of flexion, the reason for it, and he sees the results of extension as the baby moves; he visualizes a posterior position; Buist's method of pads is shown, and the mechanism or troubles of this labour are demonstrated.

With the dummy on its left side, he can, if the rubber vulva has been cut away, see how the perineum is saved and the reason for the flexion of the child's head. Each student in turn does something or takes a hand in some part of these living demonstrations.

The same sequence and system is followed with the baby as a breech or transverse lie. The student's memory visualizes exactly what happens and why. The reason and method of early external

version in a primigravida is demonstrated. He sees the extended legs and can practise Pinard's manœuvre and be convinced. Fundal pressure does not remain a meaningless term, for he sees the arms extend, and can be shown and practice bringing down the live arm and the method of rotating the baby.

Transverse lie, which is perhaps the greatest nightmare of the practitioner out East or West, can be made equally clear to the student. First show him a hand down with a head presenting, then when that has been gone over, shift the live baby into one or other oblique, with or without the hand down, and then from this go on by demonstrating all the varieties and complications of a transverse lie. He will see and memorize how the hand or foot come down and which hand it is. He will grasp for ever the meaning of a shoulder presentation, and the dangers and complications which may arise as a result of a transverse lie. He can practise passing his hand in order to grasp a live foot and so form a tactile memory picture that will never leave him.

Then, by the simple means of placing one or more small folded hand towels under the lining towel between the sacral promontory and the baby's head, he is made to understand, what to my mind is almost the most important thing in obstetrics, namely, Munro Kerr's manœuvre, for at present in India nearly 90 per cent. of those cases to which the doctor is called are late cases; that is, women who have been long in labour, with the head floating above the brim. Indeed, I know nothing in the realm of teaching so convincing, as the demonstration of a live baby gently overlapping the brim of such a dummy. The principles of a test labour, induction or Cæsarean section become indelibly carved in the memory, and the whole subject of contracted pelvis or a big child can be made perfectly manifest, for the students can perform the manœuvre one after another, and if any professor of obstetrics doubts my asseveration let him teach this way and then take his students into his lying-in or prenatal wards, as I do after demonstrations, and he will find his students able to diagnose the position of the head and the lie of the child and give a surprisingly accurate opinion on the five cardinal points of the full-time expectant mother:—

1. The relation of the fœtal head to the pelvic brim.
2. Whether the maximum circumference of the head is fixed in the brim or no.
3. Where the back and limbs are.
4. Whether the head is flexed or no.
5. What is the transverse diameter of the outlet. This is a very common type of pelvic deformity in the East; and as in the East routine vaginal examinations are not readily obtained

> I have adopted a simple guide which can be carried out by anyone without unnecessary exposure. My teaching rule is, that if by dimpling in the covering sheet you can place three fingers transversely in the sub-pubic angle between the pubic rami, then the measurement is normal between the ischial tuberosities. This clinical finding or manœuvre has never failed me, and is of extreme importance for doctors dealing with sensitive patients.

When the student has thoroughly grasped and visualized every normal and abnormal presentation, even including twins, for two small babies can always be found in any lying-in ward, then the teacher using rubber-sheathed blades can very gently demonstrate the how and why and wherefore of low and axis traction forceps, their difficulties, their dangers and their contraindications.

Similarly the methods of application, of use, and dangers of, the blunt hook and decapitator can be gently demonstrated to the class, for with a sheet shrouding the live baby in the dummy, an indelible visual memory is formed on uncovering it; the technique of application is then repeated without the sheet.

This method of teaching is so great an improvement, the results so gratifying, and the live interest of students so convincing that I am emboldened to think that if clinical units will try it, teachers will revolutionize the *ars obstetrica* of the coming generation, and the post graduate 'raze out the written troubles of the brain.'

Every demonstration can be made a clinical lecture. Every day the principles, the physiology and pathology of the "new midwifery" can be rubbed in. Every day some subject of the new-born baby and its care can be dealt with. Every day as students' interests grow and intelligence dawns, one's own ideas and enthusiasm increase.

The classes should be held in a warm room, preferably the theatre, near the lying-in ward. Each class should not be greater than 20. A nurse should always be present. The dummy should be very large and soft and the rubber vulval outlet cut away and made soft and smooth.

The baby should be a small and healthy one, and should have been just nursed, for if this is so it lies perfectly happy in its warm soft crib. In a whole year I have very rarely ever heard a whimper from the baby; even when it is turned from side to side it at once settles down to sleep again.

The last and greatest absolute requisite is gentleness combined with the closest supervision on the part of the teacher. And when the teacher is known and trusted I have never experienced the least difficulty in obtaining the consent of any mother, British or Indian,

after it has been tactfully explained to her that what one is trying to do is to save the lives or suffering of perhaps countless women and babes.

Before proceeding to the method of teaching operative midwifery I should like to digress for a moment to the subject of the post-mature fœtus, for it has seemed to me that much less importance is attached to this by all concerned than is justified; for it is not uncommon, and yet is regarded by many doctors and nurses with *sangfroid,* although when it is too late, blithely it is given as the cause of many of the cases of difficult labour, injured infant, or still-birth.

The accepted teaching to-day is that if one is satisfied that the patient is seven full days over her full-time date, labour should be started by either the castor oil and quinine or the pituitary injection technique. My own experience of these methods for primigravidæ (and this has been corroborated by enquiry of many practitioners) has not been very fortunate. In 30 per cent. of cases either it has failed, or disaster has occurred to the child, or that bugbear of the first labour has happened, I mean early rupture of the membranes without dilatation of the cervix followed by an almost complete standstill of labour.

Therefore I have formed the opinion that it would be far safer and better to teach and practice Krause's method.

How many times has not every professor heard a practitioner say that either he had no bougies and was afraid to use a septic or rotten vulcanite catheter, or, having never seen the method done as a student, he was afraid, and therefore did nothing, or waited, or used quinine? In nearly every case he will tell you that he had to apply the forceps, there was difficulty and the baby was born dead, or shortly afterwards developed what I am in the habit of calling and labelling to students as the "cephalhæmatoma syndrome," that is, the baby is born with an obvious hæmatoma, and soon after birth it refuses to suck, it becomes cyanosed, develops convulsions or twitches and shortly after dies. A melancholy but very common syndrome due, as I have proved, post-mortem, on many occasions, to those injuries so ably depicted and described by Eardley Holland.

This being so, it is our duty to lighten the responsibility of the doctor and more often demonstrate to the student and post-graduate that the difficulties and dangers of the Krause method have been exaggerated and, to say the least, are not as great as the chances, in a primigravida, of failure with quinine, or the risks of waiting to both mother and child if the fœtus is large and head hard.

The method I teach and the method I have used on many occasions when bougies have been doubtful and I have been away

from my hospital, is easy, and merely depends upon the possession of a stethoscope; one's own stethoscope and perhaps that of the practitioner who has called me. It is this: Take off the two or four rubber tubings, and down the middle of each pass a thin whippy piece of bamboo or any other whittled piece of stick, each about 12 inches long; a piece of silk is then tied tightly round the

Fig. 1. Bougie made of indiarubber tubing and bamboo.

tubing just above each end of the stick, as in Fig. 1. Any sharp or redundant ends are cut off and the bougie can then be sterilized by thorough boiling, and is ready for use. It is a perfect bougie, and I have never had an accident with it or ruptured the membranes. I have used two with success when only rather large stethoscope tubing was available, but more often have used four of the ordinary sized arabesque rubber tubings supplied with a new stethoscope. Having used them and proved them I am certain that this method is safe and good, and I feel if students saw this or the classical Krause method of induction more often, there would be fewer catastrophes and less delay, and the bogey of bougies become a John Brown's body.

In order to demonstrate the method with the live baby and the dummy, all that is necessary is to cut the apex off a conical bag of clean canvas or linen. With the baby lying in the brim this bag is fitted loosely over its head, the cut apex representing the cervix. On this a vulsellum or sponge holding forceps is fixed, a student holds a posterior speculum, and using my bougie or the ordinary one, the method, with its pros and cons and troubles, is detailed. My own opinion is that if the technique was known and seen more often the tale of Cæsarean sections to-day would be less, for induction would be done more often and earlier, as our students learned to appreciate the vast value of the Munro Kerr manœuvre; and, moreover, the tale of disasters in post-mature primigravidæ would greatly diminish, for praise it as we may, the castor oil quinine technique results, in private or in hospital, are in 30 per cent. of cases more disquieting for mother, child and doctor. My own attitude is that " faute de mieux " in a primigravida I would advise pituitary or quinine, but otherwise always advise, teach and use bougies; for, after 13 years' experience—excepting the Great War time—on the staff of a hospital, I must say I always feel anxious about the first child when post-mature if I know quinine has been used. Indeed, I have seen so many failures and heard so many

excuses, that I would almost, if called late, now say to a primigravida who had a post-mature child which was palpably large and also probably presenting with the occiput posterior, "If you will not permit me to use bougies, let me do a Cæsarean section to give you a better chance of a live baby, rather than use quinine." I do not for a moment deny that quinine and pituitrin, as a rule, bring on labour; they do, but at what a price to the first baby at such times, and I contend that such a disaster is fundamentally at the door of modern clinicians who are either not in touch with general practice conditions or have forgotten their results while they were residents. If we teach an easy and safe method the public, the Empire and the profession will be grateful. What we have to din into the public and practitioners is that every pregnant woman must be examined properly in her 37th week.

Finally, at this juncture of the demonstration, while the canvas conical bag is *in situ* over the baby's head, if two split circular $4\frac{3}{4}$—5 in. diameter parchment or rubber diaphragms are made and attached, Figs. 2 and 3 (each diaphragm representing respectively the fascia and muscle of the pelvic plate); one should insert this simple diaphragm under the baby's head in the cavity of the pelvis, with the conical cut end of the bag projecting or grasped between the two layers, then it is easy to make manifest the points about the lower uterine segment and demonstrate what must be the effect of the forceps traction on the cervix and the pelvic diaphragm if applied before the maximum circumference of the child's head has passed through them. The actual splitting and tearing of the planes can thus be indelibly impressed, and the pathology and ætiology of prolapse dealt with in all its clinical varieties.

Following such demonstrations it is easy to show the methods, advantages and disadvantages of artificial dilatation of the cervix with fingers or De Ribes's bag; and if a four inch insertion of tough elastic webbing be sewn into the cut conical bag representing the cervix and lower uterine segment, the student gets a very excellent memory picture of how dilatation occurs.

A thin sorbo sponge, moreover, makes a very excellent dummy to represent a normal or abnormally situated placenta.

Operative Midwifery.

At a cost of £2 any competent carpenter can fashion, out of a tea or sugar box, a very excellent belly and pelvis, the whole inside and outside being lined with zinc or aluminium. The vulval outlet is made diamond-shaped and of approximately correct dimensions.

Every lying-in hospital throughout the world furnishes its

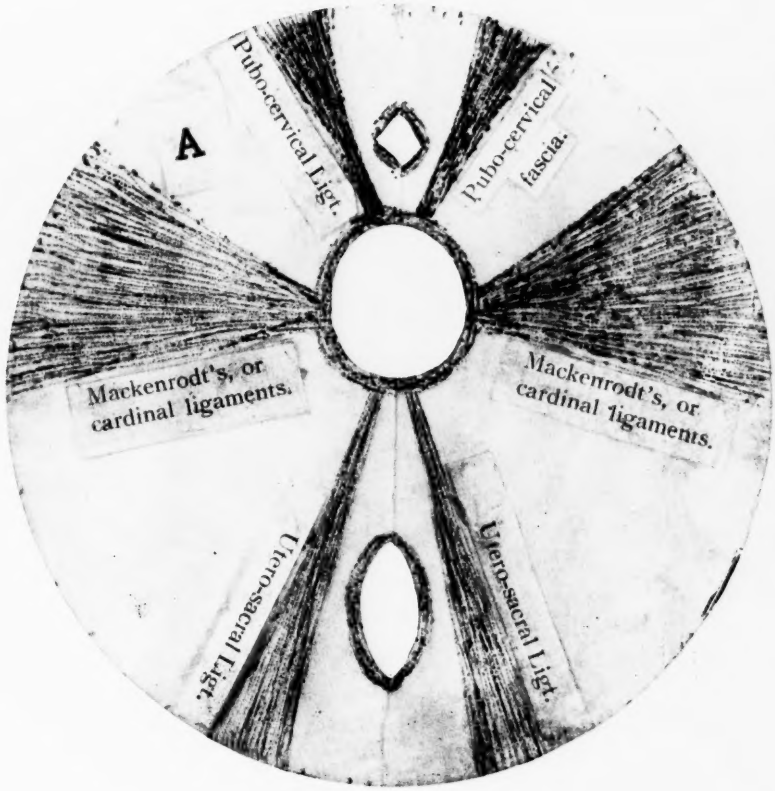


Fig. 2. Fascia of the pelvic plate.

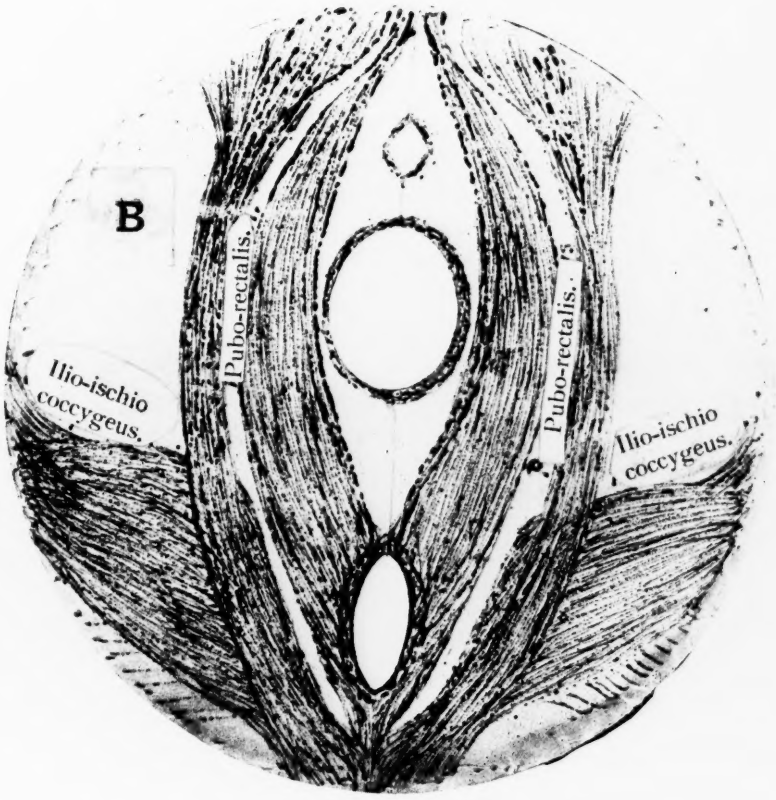


Fig. 3. Muscles of the pelvic plate.

morgue from time to time with still-born infants unclaimed and unwanted. This is the material which one at once reverently uses :

1. Every mechanism, every presentation, every method of delivery is done student by student ; then
2. One student as operator, one as assistant (under the close supervision of myself) does every operation of obstetrics possible, the first two do version, the second two apply the forceps, the third the blunt hook and fillet, the fourth do cranioclasm and cleidotomy. When another body is available the last two operations are omitted and decapitation is performed, and a careful autopsy is made in order to find or demonstrate the cause of still-birth or neonatal death, and thus I have been able to bring home to the class the great clinical and obstetrical value of Eardley Holland's work, and point out how such could have been possibly avoided if the case had been seen earlier and antenatal care been exercised. A practical and telling lesson in India where the proportion of obstetric difficulties seen late in hospitals is very great.

Every operation is made a clinical lecture and the whole technique is carried out meticulously.

The value and ease of such instructions will be at once realized, and I feel very strongly that in ratio to the keenness and flair of the professor that if such methods were universally adopted much suffering and torment of mind would be eradicated, for there can be no doubt that an intense fog of ignorance and fear surrounds the expectant mother, and I contend that much of this ignorance and fear is due to pharisaical and archaic methods of teaching.

Before and during the time the student or nurse is attending his or her first six lying-in ward cases they should receive such living demonstrations that they may form a permanent visual memory of what is happening. Then, and not till then, dare we say *nunc dimittis*.

The sceptical or sentimental may raise the question : Why not use the still-born fœtus for the whole series of demonstrations? My answer to that is :—

1. After trial I found it not nearly so effective or convincing to students.
2. The warm living baby lends an atmosphere of vital interest, importance and memory.
3. Provided the rules mentioned are carried out no mother of any race has ever objected.

Presacral Tumours of Congenital Origin.*

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From the Gynæcological Department of the Middlesex Hospital.

Mrs. V. W., aged 43, was admitted to the Middlesex Hospital under the care of Mr. Victor Bonney on 12 May, 1923. She gave the following history: At the age of 13 years pain of an aching character was felt at the bottom of the spine and it was about the same time that her parents noticed a fullness of the right buttock. Owing to the gradual increase in size of the swelling advice was sought at Birmingham a year later and operation advised. In the same year the swelling was removed through a right gluteal incision by the late Mr. Jordan Lloyd. Eighteen years later, at the age of 32, the swelling reappeared and a second operation for its removal was performed through a similar incision by Sir Gilbert Barling. She married in 1917 at the age of 37 and in September 1920, a full-time living child was born without complications, with the exception of a badly torn perineum. She became pregnant for the second time in September 1922, and it was about this time that she noticed the reappearance of the swelling in the right buttock which steadily increased in size, but it was not until the end of April 1923, when she was about eight months' pregnant, that she consulted her doctor. On admission to hospital the following month the fundus of the uterus had reached the infrasternal angle. The child's head was floating above the pelvic brim and could not be made to engage. On vaginal examination a cystic swelling could be felt filling the pelvis, pushing the posterior vaginal wall forwards against the symphysis pubis and the rectum against the left side of the pelvis. The cervix could not be reached. The cystic swelling in the pelvis was continuous with a large cystic swelling in the right buttock and coccygeal region. (Fig. I.) Owing to an accident to Mr. Victor Bonney, Mr. Comyns Berkeley on 30th May performed Cæsarean section and a healthy living child was delivered. It was then seen that a retroperitoneal cyst was firmly wedged in the pelvis. With the intention of getting better access to the cyst the body of the

* Paper read at a meeting of the Obstetric Section, Royal Society of Medicine, May 1st, 1924.

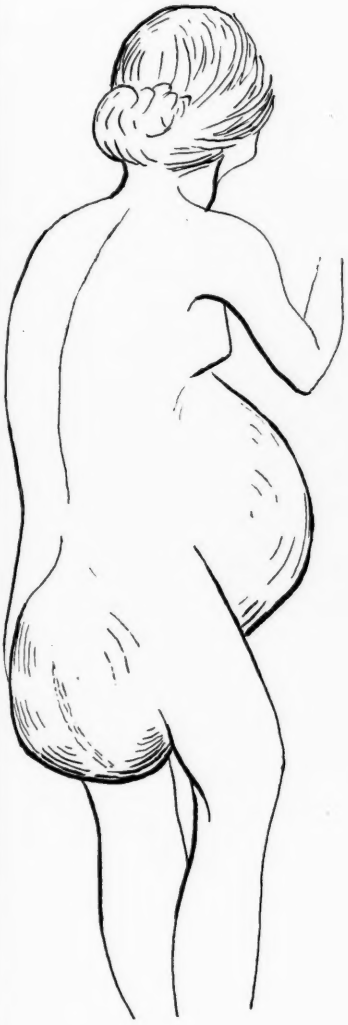

Fig. 1. Diagram showing gluteal swelling.

Fig. 2. Pultaceous mass removed from the false capsule of the cyst.

uterus was removed. The appendages of both sides were noted to be healthy. At the anæsthetist's request no attempt was made to remove the cyst on account of the already rather extensive loss of blood. It was therefore tapped from above and about four pints of light brown fluid withdrawn. After a rapid recovery the patient was sent to the Middlesex Hospital Convalescent Home 17 days later. On 3rd September, three months after the operation, she was again admitted to the Middlesex Hospital where it was found that the cyst had refilled. On deep palpation above the symphysis pubis the cystic swelling with a smooth upper surface could be felt rising from the pelvis.

On 5th September under a spinal and general anæsthetic Mr. Victor Bonney opened the abdomen through a mid-line sub-umbilical incision. The cyst was seen to fill the true pelvis but did not rise above the level of its brim. The upper surface was smooth and covered by peritoneum. The bladder was raised and the rectum pushed to the left side of the pelvis.

The peritoneum covering the cyst was divided transversely, the incision extending from one side of the pelvis to the other. The peritoneum was gently separated from the cyst wall and the cyst separated from surrounding structures in the pelvis as far as the fingers could reach. The ureters were isolated on each side and the right internal iliac artery was ligated with the object of diminishing bleeding from its branches at the next stage of the operation. The abdominal incision was temporarily closed and the patient placed in the left lateral position with the thighs slightly flexed. An incision was made extending from the lower end of the sacrum outwards and to the right for 8 inches passing $1\frac{1}{2}$ inches above the ischial tuberosity. The gluteus maximus was retracted outwards after dividing some of its innermost fibres, and the cyst wall isolated. The surrounding structures had formed a false capsule in the wall of which were masses of yellow pultaceous material ranging from the size of a pea to that of a hen's egg, each with a definite capsule (Fig. II). These masses were only loosely attached to surrounding structures and could easily be enucleated. The cyst was isolated as far as its exit from the pelvis through the sacro-sciatic foramen and it was during the attempt to isolate it from the latter structure that the cyst wall ruptured and about four pints of light brown fluid escaped. It was then seen that most of the fibres of the right sacro-sciatic ligament had been divided at the previous operations and that the coccyx and the right side of the lower end of the sacrum had been removed. The cyst wall was now easily removed and an excellent view afforded of the pelvis and its contents from below. A rubber drainage tube was inserted and the gluteal incision closed.

The patient was again placed on her back and the abdominal wound, which had been temporarily closed, opened. The edges of the divided peritoneum were brought together and the abdomen closed without drainage. On discharge from hospital she walked well. Micturition normal, bowels regular. Quite recently she wrote to say she feels very well, and can do her housework as well as look after her two children.

The cyst therefore consists of a pelvic portion and a larger gluteal portion, the one constricted off from the other by the margin of the sacro-sciatic foramen. The lining of the cyst was everywhere smooth except where its wall lay in contact with the rectum. At this spot there were several intracystic jelly-like tufts. The wall of the cyst varied in thickness from 1 mm. to 1 cm. The intra-pelvic portion was thicker than the extra-pelvic portion. The thickest part was that from which the intracystic tufts took origin.

On microscopic examination of sections taken from different parts of the cyst it was found that its wall consisted of fully-formed fibrous tissue and its inner surface was covered by squamous epithelium (Micro. I) which, in places, was showing keratinization. No trace of hair follicles, subaceous glands or sweat glands could be found. In the wall of the cyst were to be seen groups of cells containing pigment, and in the neighbourhood of the intra-cystic tufts the squamous epithelium was replaced by a layer of granulation-like tissue in which were numerous foreign body giant cells (Micro. II). The intra-cystic tufts themselves were found to be composed of groups of tubules (Micro. III) lined by columnar cells of intestinal type lying in a stroma of cellular fibrous tissue. No evidence of muscle, fat, bone or cartilage could be detected.

The specimen is a presacral teratomatous cyst.

Presacral tumours of congenital origin can be divided into—

(1) Those which are present at birth.

(2) Those which are not, as a rule, discovered until puberty or later.

The so-called congenital sacro-coccygeal teratoma is the only presacral tumour belonging to group (1). It contains derivatives of the three embryonic layers and resembles—

(*a*) The common ovarian dermoid, attached to the wall of which are malformed organs and limbs, or

(*b*) The rare multiple cystic ovarian teratoma.

These teratomata are almost invariably attached to the coccyx.

In group (2) two types of tumours occur:

(*a*) Solid tumours, which are subdivided into—

1. Those of neural origin, one of which has been described by Law,[1] and to which I shall refer later.

Fig. 3. The pelvic portion of the cyst is opened posteriorly to show the intra-cystic tufts.

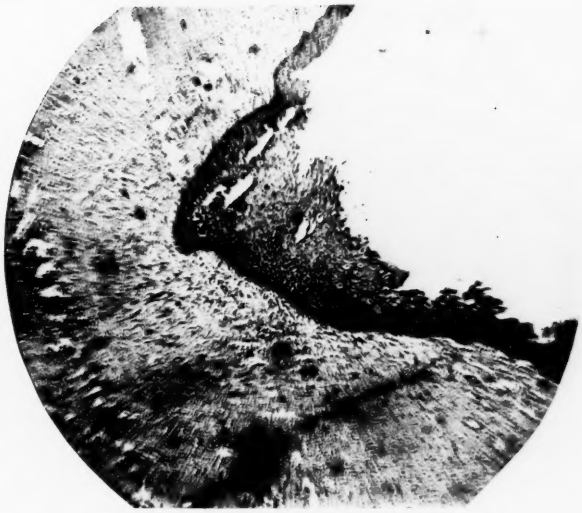

Fig. 4. Section showing cyst lined by squamous epithelium.

Section showing foreign body giant cells.

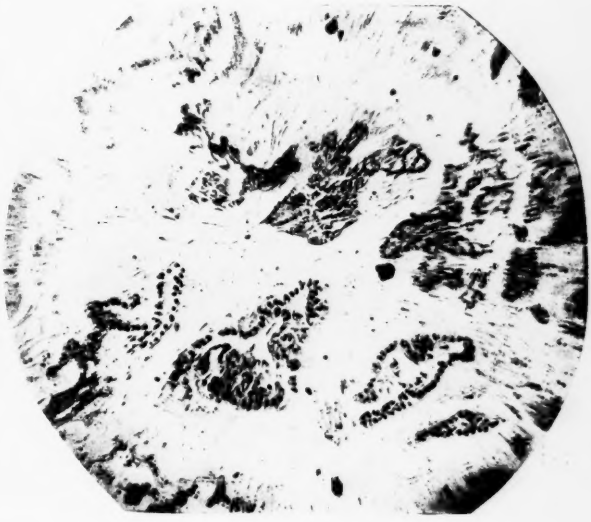

Fig. 6. Section through an intra-cystic tuft showing tubules lined by columnar epithelium of intestinal type.

2. Those of notochordal origin, which have recently been fully described by Stewart.[2]

(*b*) Cystic tumours, which are subdivided into—

1. Simple cysts which are lined by columnar or squamous epithelium resembling skin with or without skin appendages.
2. Complicated dermoids showing teeth and probably other structures.

On the assumption that the presacral tumours in group (2) are not, as a rule, present at birth, I suggest that their source of origin is different from those in group (1), and that they originate from cells which at one stage of the development of the embryo have ceased to grow and have become secluded. In some cases puberty seems to be the stimulus which renews the growth of the secluded cell.

A common example of a tumour originating from a secluded cell is the ovarian dermoid or teratoma. On the inner side of each Wolffian ridge a thickening of mesoderm takes place covered by a layer of thickened epithelium, which is continuous with the epithelium lining the body cavity. This thickened mesoderm is known as the genital ridge and its epithelial covering as the germinal epithelium.

By the continued growth of the genital ridge a mesentery is formed, and the future sex gland is represented by a core of connective-tissue covered by germinal epithelium. In the female the sex cells or primitive ova are found between the cells of the germinal epithelium, and the latter, by a process of invagination, carry the primitive ova into the ovarian stroma, and thus the primitive Graafian follicles are formed. Beard, who carried out his researches on the skate, denies that the sex cells are derived from the germinal epithelium. He believes that before there are any signs of an embryonic area and during the later stages of segmentation of the ovum, the sex cells are set aside from the cells which are going to form the future embryo, and that these sex cells arrive at their destination in the sex gland by what he calls the germinal path. Beard states that these sex cells are distinguished from the cells which are going to form the embryo by the absence of mitotic figures, their irregular shape and amæboid movements and by their altered staining reactions. That the cells formed in the early stages of segmentation of the ovum are totipotential and capable of producing individual embryos is confirmed by the experiments on certain lower animals, notably, the frog, the jelly-fish, the newt and the sea-urchin.

Drisch succeeded in isolating the blastomeres of sea-urchins'

eggs in the two and four cell stages, and obtained normally-formed specimens. As Bland-Sutton[3] puts it: "Since the discovery that mechanical stimulation is sufficient to start the segmentation in an ovum it has become a commonplace experiment in the laboratory to irritate the eggs of frogs and produce what are called "fatherless frogs." Ovarian dermoids might be not inaptly called "fatherless embryos."

Should the sex cells, which are potential fatherless embryos, fail to reach the sex gland and be secluded elsewhere in the retro-cœlomic tissues it is easily understood how chance teratomata may arise.

It is common knowledge that teratomata of the ovary are almost never present in children under 12 months old, and very few cases are reported occurring in girls under the age of puberty.

Granted that the ovum is the equivalent of a totipotential blastomere, and that an ovarian teratoma originates by parthenogenesis from a secluded ovum it is not surprising that other teratomatous growths derived from cell seclusions are not, as a rule, present at birth. Everyone is agreed that the simple dermoid cysts which occur in the middle line of the trunk and neck and at the junction of the facial clefts, the result of included epithelium, are not always present at birth. These teratomata, the result of cell seclusion, Bonney termed endogenous teratoma. When the other site of election for teratomata, the sacro-coccygeal region, is examined it is found that teratomata, which contain derivatives of all three layers of the embryo, are, so far as my knowledge goes, always present at birth. Such a fact is most striking, the more so when we consider the deep relations of the ventral surface of the sacrum and how easily such a tumour could evade detection at birth. It must therefore be assumed that the starting point for such teratomata is somewhere near the tip of the coccyx, and they follow the path of least resistance and appear on the surface. As well as the congenital sacro-coccygeal teratoma there is another teratoma which shows derivatives of the three layers of the embryo, and is always present at birth, and that is the teratoma which occurs in the region of the basi-sphenoid and known as epignathus. It grows from the roof of the pharynx and projects into the mouth, or less frequently grows upwards into the cranial cavity in the region of the sella turcica. Such teratoma, which are always present at birth, must be analogous to congenital malformations, such as conjoined twins, bicephalous monsters, etc., the result of dichotomy of the fœtal axis. These Bonney[4] termed exogenous.

That dichotomy of the fœtal axis offers an explanation for conjoined twins and bicephalous monsters, is supported by the experiments of Speman, who was able to produce two completely

separated embryos up to all stages of monstrosity by tying a fine hair round the developing ovum of the newt parallel to its long axis while it was still in the gastrula stage. If dichotomy is complete, equal and symmetrical, the result is monochordial twins. If dichotomy is all but complete and the dichotomized parts are equal and symmetrical, conjoined twins are produced. Superior dichotomy gives rise to a double-headed monster, inferior dichotomy to supernumerary legs, and so on. Superior and inferior dichotomy have been given as an explanation for epignathus and the congenital sacro-coccygeal teratoma respectively.

More recently the explanation which has gained most popularity amongst pathologists for such teratomata is that given by Adami,[5] who suggests that they are due to the continued growth of totipotential cells from the superior and inferior growing points after the anlage of the fœtal axis has been laid down. The anterior growing point is situated in the neighbourhood of the sella turcica, the posterior growing point is situated between coccyx and anus. Such an explanation would account for the predilection which congenital teratomata have for the sacro-coccygeal region and for the much less common site the basi-sphenoid. It will be noted also that such a neoplastic formation is analogous to a congenital malformation and therefore must be present at birth. There are therefore two groups of teratomata :—

1. Endogenous teratomata taking origin from secluded cells. Not as a rule present at birth.
2. Exogenous teratomata taking origin from
   (*a*) Dichotomy of the fœtal axis.
   (*b*) Anterior or posterior growing point cells. Always present at birth.

There are several possible sources in the sacral region for tumours taking origin from secluded cells :—

(1) The termination of the neural tube.
(2) „ termination of the notochord.
(3) „ neurenteric canal.
(4) „ post-anal gut.

If the surface of the ovum of the developing chick is examined the embryonic area is represented by a dark oval-shaped area. There appears a dark line which runs forward from the caudal extremity of this embryonic area and ends about its middle. This is known as the primitive streak, which later deepens from before backwards to become converted into a groove. At this stage two ridges, termed the neural ridges, appear near the cephalic end of the embryonic area, where they are continuous, and grow backwards

on either side and eventually join posteriorly by cutting their way through the cephalic extremity of the primitive groove. This cephalic extremity, thus cut off from the remainder of the primitive groove, deepens until a communication is established with the primitive hind gut. The neural ridges unite in the middle line to form the neural tube. The communication between the neural tube and primitive hind-gut is known as the neurenteric canal. It will be seen then that the neurenteric canal is formed by an ectodermal invagination.

The proctodeal invagination which is going to form the anal canal joins the hindgut on its ventral aspect a short distance in front of its extremity. That part of the hindgut which lies distal to this junction is known as the post-anal gut. Both the neurenteric canal and the post-anal gut at a later stage of development disappear.

Law[1] described a tumour which was obstructing labour in a girl 16 years old. On section the tumour was solid, and consisted of embryonic and fully-formed nerve tissue undergoing malignant changes. The origin of such a tumour might be ascribed to a totipotential growing-point cell in which the other two embryonic layers had been suppressed. Such an explanation is unlikely in the absence of evidence to show that such tumours are present at birth. Law's tumour was not attached to the coccyx but took origin higher up in the pelvis and was attached for one inch to the periosteum of the middle of the ventral surface of the sacrum. It was not visible on the surface. Such a tumour probably originates from cells which have become differentiated and are no longer totipotential. Law suggests that the tumour springs from some misplaced remnants of the terminal portion of the neural tube, or in other words from secluded cells.

Another tumour which occurs in the sacro-coccygeal region and also at the base of the skull and which is not always present at birth but of congenital origin, is the chordoma or notochordal tumour. Stewart[2] collected the recorded cases and found that the sacral tumours were closely connected with the dorsal or ventral aspect of the sacrum. In size they range from that of a tangerine orange to an adult head. They are lobulated, homogeneous, and on section show areas of hæmorrhage. Microscopic examination reveals characteristic mucin-containing cells. They are described at ages ranging from a 7 months' fœtus to 65 years. Average age is 47. They are of low malignancy. Metastases are rare. Extension by infiltration is common. Such a tumour has been produced experimentally in animals by trephining the ventral aspect of a vertebra before the notochord has disappeared.

Middeldorpf[6] was the first observer to describe a post-anal gut

tumour. His specimen was removed by Kraske in 1884 from a one year old female child. Surrounded by fat it contained a loop of gut, the blind end of which was loosely attached to the rectum. It discharged its contents through a fistula which opened on the surface between the anus and coccyx. On section the gut differed in no way from large intestine. It contained a mucus-secreting columnar epithelium with Lieberkuhn's follicles, submucous coat with solitary glands, and circular and longitudinal muscle fibres. A serous coat was missing.

If the origin of Middeldorpf's tumour is to be ascribed to the post-anal gut it is not a tumour in the ordinary pathological sense. It is the persistence of that part of the large gut which normally disappears. No such similar tumour has been recorded.

On the other hand several congenital sacro-coccygeal teratomata have been reported in which were loops of gut (small and large).

Simple presacral cysts, lined by squamous or columnar epithelium, probably originate from cells of the neurenteric canal. Up to 1899 Skutsch[7] collected 17 cases of simple dermoid cysts arising in the pelvic connective tissue, including two of his own. They all occurred in females with the exception of one. The two cases recorded by Skutsch were not noticed until after miscarriages. Five of the cases he collected complicated pregnancy.

Ord and Sewell[8] recorded a case of a simple skin-lined cyst occurring in a man, aged 28 years. It filled the pelvis and extended into the abdomen as high as the level of the umbilicus. The rectum, the bladder, small and large intestines were attached to its anterior surface.

Rutherford[9] and Lund have also recorded similar cases. Rutherford's case occurred in a woman, aged 34, who had had a normal delivery ten years previously. A cystic swelling in the right buttock extending into the pelvis for three inches behind the rectum made its appearance shortly after the birth of her child. A cyst, the size of an orange, was removed successfully by Kraske's method. On microscopic examination the cyst was found to be lined by squamous epithelium and sweat glands.

Lund's[10] case occurred in a woman aged 24. A presacral skin-lined cyst, which she noticed for two and a half years, was partially removed by Kraske's method. The portion of the cyst wall adherent to the rectum was left behind.

Recently Turner Warwick showed me sections taken from the wall of a single cyst which was removed from a man 40 years old. It had been noticed for years, and lay between the sacrum and rectum, and was lined by columnar epithelium.

Dermoid cysts, containing teeth and other structures, which do not appear until puberty or later, are very rare.

Fancourt Barnes[11] recorded such a cyst in a primigravida, aged 28 years, who was admitted to Hospital with a presacral cyst, which was obstructing delivery. The cyst, which was the size of a child's head, displaced the vagina forwards against the symphysis pubis. Porro's operation was performed (the sixth in this country) and a healthy male child delivered. The cyst, after its removal, was found to be lined by skin, and contained teeth in the nodular thickenings of its wall.

Such complicated presacral dermoids probably originate from wandering sex cells or secluded blastomeres.

Conclusions.

There are several possible sources of origin of presacral tumours of congenital origin:—

1. Dichotomy of the fœtal axis with production of
   - A. Monster formation.
   - B. A separated embryo which later becomes parasitic and
     - *a*. Blends with the autosite, or is
     - *b*. Included in the autosite.
2. A growing-point cell.
3. A wandering totipotential sex cell.
4. A secluded notochordal cell.
5. A secluded cell of the neural tube.
6. The post-anal gut.
   - *a*. The persistence and continued growth of an embryonic remnant.
   - *b*. Secluded cells of the post-anal gut.
7. The neurenteric canal.

In considering the origin of this specimen I should at once exclude 1, 4 and 5.

1. *Dichotomy of the fœtal axis.* All such formations are easily recognized at birth.

2. *A growing-point cell.* The posterior growing point is situated near the surface between the coccyx and anus, and teratomata resulting from its growth are analogous to congenital malformations, and for these two reasons would be present at birth and easily recognized. Further, the structure of these congenital sacrococcygeal teratomata resulting from a posterior growing-point cell, differs so greatly from that of this specimen that I consider it unlikely that the posterior growing point can be its origin.

3. *A wandering totipotential sex cell.* This source cannot be definitely excluded, but in structure this specimen does not resemble the common ovarian dermoid, nor would it explain the predilection which similar cysts have for the neighbourhood of the sacrum and coccyx.

4. *A notochordal tumour.*
5. *Nerve tumour.* In no way does this specimen resemble a chordoma or a tumour of neural origin.
6. *Post-anal gut.*
   a. That the cyst is not a loop of gut is obvious.
   b. That secluded cells of the post-anal gut are included in the specimen is suggested by the fact that epithelium of intestinal type was discovered in the wall of the cyst where it lay in contact with the rectum.
7. *Neurenteric canal.* That the cyst took origin from secluded cells of the neurenteric canal is suggested by the facts that—
   a. It was not noticed at birth.
   b. After the removal of the original cyst, presumably of a similar nature, other cysts developed. It is not unreasonable to conclude that they took origin from other secluded cells of the neurenteric canal.
   c. Its structure resembled what would be expected to result from an ectodermal invagination which had effected a communication with the hind gut.

Some Recorded Cases of Congenital Presacral Tumours.

White,[12] 1901. Female child, aged 3 years. A congenital sacro-coccygeal teratoma between rectum and sacrum. A multilocular dermoid cyst with bone. Removed.

Campbell,[13] 1909. Child, 3 months. Congenital sacro-coccygeal tumour. Coccyx absent. Removal.

Davis,[14] 1910. Sacro-coccygeal cyst in female child. Almost filled the pelvis and pushed rectum to one side. Attached to coccyx. Removal.

Lediard,[15] 1912. In female infant 2 days old. Sacro-coccygeal teratoma between coccyx and anus. Pedunculated. Pedicle 2 ins. wide. Tumour removed. Fistula for seven years.

Preston Maxwell and Gordon Ley,[16] 1912. Girl, aged 16. Congenital sacro-coccygeal teratoma. Two dermoid cysts embedded in fat. Attached to wall of one cyst was a loop of large gut unattached to patient's gut. Removed by a two-stage operation. Tumour adherent to coccyx.

Woolsey,[17] 1913. Male infant. The congenital sacro-coccygeal teratomatous cyst displaced the rectum and scrotum forwards causing retention of urine and swelling of legs. Tumour pressed on iliac veins. Partial extirpation. No recurrence up to time of publishing.

O'Kelly,[18] 1913. Boy, aged 11 months. A congenital sacro-coccygeal tumour displacing rectum forwards. Bits of organs represented. Removal.

Young,[19] 1914. Female child, aged 11 months. Congenital sacro-coccygeal tumour lying between sacrum and coccyx attached by narrow pedicle of bone. Extirpation.

Gwynne Williams,[20] 1915. Female child, aged 3 years. Sacro-coccygeal teratoma between anus and coccyx. Extirpation with coccyx. Tumour adherent to lower end of sacrum.

Montgomery,[21] 1922. Boy, aged 5 months. Congenital sacro-coccygeal tumour with fully-formed scapula inside.

Wood.[22] Female infant, aged 2 months. Sacro-coccygeal cyst, weighed 8 pounds. No microscopic report.

Jobson.[23] Girl, aged 15. Congenital sacro-coccygeal tumour with base as broad as buttocks and reached to knees. No operation.

Kiderlen in 1899 collected from the literature 122 cases of completely or partially presacral congenital teratomata.

Parin[24] quotes the following 16 cases of congenital presacral tumours recorded in the literature from 1900 to 1909 inclusive.

1. Bayer, 1901. Congenital sacro-coccygeal cystic tumour in a boy nine weeks old. The tumour was situated in the right gluteal region and was lost upwards in the sacro-sciatic foramen. Examination per rectum showed an upward continuation of the tumour between rectum and sacrum. Extirpation of the tumour. Cure. The tumour consisted of derivatives of all three germinal layers. (Nakayama.)

2. Linser, 1901, second case. Seven months' old boy. Tumour as large as a fist, situated mainly on the posterior surface of the sacrum but reaching upwards to the lower end of the lumbar vertebra and downwards to the anus. During operation (without anæsthesia) it appeared that the posterior rectal wall was exposed to a great extent. The sacrum lacking for the most part; coccyx lacking. Complete cure. Teratoid mixed tumour.

3. Linser, third case. Girl, three months old. The tumour was only for a small part on the posterior surface of the sacrum; downwards it stretched almost as far as the anus. A large part of it was between the os sacrum and rectum. Operation without anæsthesia. Fœtus in fœtu. Cure.

4. Dobromysslow, 1902, first case. Ten years old child. Tumour on anterior and posterior side of sacrum. Operation. Teratoid mixed tumour. Cure.

5. Dobromysslow, second case. Fifty-four years old man. Congenital tumour in shape of a horse-shoe on anterior and posterior side of sacrum. Fistula. Operation. Permanent fæcal fistula. The tumour contained numerous cysts, glands, thyroid, adrenals, sympathetic ganglion, and an embryonic respiratory apparatus.

6. Penzo, 1903. The congenital tumour developed in the sacral hollow. Operation in sixth year of life. Elements of all three germinal layers, and a kind of rudimentary eye found.

7. N. Petrow, 1903. Sixteen years old girl. Congenital tumour between sacrum and rectum, reaching partly into the cavity of the false pelvis. Partial extirpation of the tumour together with the coccyx; later scraped out. Healing. The cystic walls were covered with one or more layers of epithelium; many-layered pavement epithelium, ciliated epithelium, lymphatic follicles, glands, transversely striped muscles, nerves, and bones were present.

8. Engelmann, 1904. Infant, three days old, boy, with a tumour larger than a fist, which had pressed the sacrum and coccyx upwards and the anus downwards. During operation the peritoneum was torn. Death. Mixed tumour (cartilaginous and osseus tissue, transversely striped muscle-fibres, glia, ganglion cells, nerve fibres, various epithelia, and skin).

9. Engelmann. Girl, six weeks old. Tumour the size of an apple. Had pressed the sacrum slightly upwards, the anus downwards. At the operation it appeared that the tumour was adherent to the rectum and sacrum. Cure. Mixed tumour (cartilage, smooth and transversely striped musculature, various epithelia, glands, intestine-like formation, glia, nerve fibres, and ganglion cells).

10. de Gætano, 1907. Three year old girl; voluminous tumour of the recto-sacro-coccygeal space. The tumour was ulcerated in various places. Operation fairly difficult on account of adhesions with rectum. Death 20 hours after operation. The extirpated tumour weighed 1,155 kg. Teratoma.

11. Rolando, 1909. A large tumour of the hip-joint extending into the pelvis with suppuration in a six month old baby. Operation, with favourable recovery. The extirpated tumour contains entero-cysts (the process in the pelvis contains a well-differentiated limb).

12. Heinzmann, 1909. Girl, six weeks old. Cystic sacral tumour. Extirpation. Cure. After 10 years another large tumour formed, which was extirpated. Numerous cysts covered partly with cylinder, partly with pavement epithelium; in the walls smooth muscle fibres, intestinal glands, and intestinal follicles.)

13. Motschalow, 1909. Nine years old boy. Congenital tumour with fistula in sacro-coccygeal region. Part of tumour between rectum and sacrum. Operation. Recovery. Teratoma.

14. Muchanow, 1909. Girl, six months old. Congenital tumour in sacro-coccygeal region, partly on the anterior surface of sacrum. Operation. Cure. Teratoma.

15. Chworostanski, 1909. Congenital tumour, as large as a

child's head, partly presacral, in a girl two months old. Operation. Death half an hour after operation. Cystic mixed tumour.

16. Female, aged 20. Presacral teratoma since birth. Fistulæ behind anus since aged 10. Extirpation. Multiple cysts lined with all kinds of epithelium. Loop of intestine resembling small intestine. Other parts of tumour show structures resembling duodenum, fundal region of stomach, large intestine, salivary glands, pancreas, urinary bladder, trachea, and nerve tissue.

The Following Presacral Tumours Showed Malignant Changes.

1. Pringle,[25] 1907. Presacral tumour fixed to sacrum. Noticed 35 years previously. Two metastatic growths in groin. One appeared 33 years ago, and the other 20 years ago.

2. Goldthwaite,[26] 1909. An apparently cystic presacral tumour in a woman 44 years old. Difficult child-birth nine years previously. X-ray showed tumour eroding the sacrum and extending through to dorsal surface.

3. Pearse,[27] 1921. Male, 63 years. Presacral tumour of neural origin excised by parasacral route with recurrence in scar of operation. Cystic. Treated by excision and X-rays. No recurrence.

Parin cites the following cases of mixed tumours of the sacro-coccygeal region becoming malignant and setting up metastases.

1. Czerny. Fifty-five years old patient, woman. A congenital sacral teratoma, which had ulcerated in her 46th year, was removed. In it were found skeletal formation; cysts, which were covered partly with ciliated epithelium, partly with epidermic cells; nerves; intestinal glands. The ulcerated surfaces showed the structure of a carcinoma. Epithelial masses formed after the operation, and their examination confirmed the belief that they were malignant.

2. Frank. A case of mixed tumour in the ischio rectal fossa on the right side, consisting of connective, adipose, muscular, myxosarcomatous and cartilaginous tissue, and cysts, which had undergone a sarcomatous transformation (myxosarcomatous metastasis in the same place on the left side).

3. Rudolphy. A case of malignant tumour in a child. The cystic walls were covered with cylinder epithelium, and in them were smooth muscles. In the lung metastatic nodules were found at the post mortem examination.

4. Gramm. One and a half year old girl. Congenital tumour as large as a man's head on the buttocks, reaching into the false pelvis. The tumour had undergone a malignant transformation (disintegration of the tumour and numerous metastases in the

inguinal folds). The post-mortem showed the tumour to consist of tissue rich in cysts, and parts of cartilage and bone (teratoma). Multiple metastases in the lungs.

5. Hinterstösser, 1908. Sacral tumour in new-born infant. The histological examination revealed pieces of cartilage and bone, smooth and transversely striped muscles, gland-like formations and soft masses of the structure of a round-celled sarcoma. Two years later there was a local recurrence at the site of the operation. Death during second operation. Histological examination of the recurrent tumour and metastases in lungs and liver showed the structure of a large-celled alveolar sarcoma.

6. Ant. Bergmann (iv.). Although the microscopical examination of this extirpated congenital coccygeal tumour showed no malignant properties (many-layered cubical epithelium with which the hollow spaces were covered, smooth and transversely striped muscle fibres, and bone trabeculæ), yet a recurrence occurred with metastases in the flexures of the groins. Death. Metastases in the lungs. Mixed tumour with malignant transformation into sarcoma.

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AN INTERESTING SUMMARY BY SKUTSCH[7] OF SIMPLE DERMOID CYSTS ARISING IN THE PELVIC CONNECTIVE TISSUE.

No.	Author and Source.	Age, Births, Clinical Condition.	Size, Site, Consistence of Tumour.	Treatment.	Result.	Remarks.
1.	Birkett. *Guy's Hosp. Reports*, 1859, 3 ser., v, 252.	25. Female. Prominence in anal groove noticed for two years.	Larger than a walnut. Between rectum and coccyx somewhat to the right. Cyst with atheromatous pulp.	Incision. Extirpation.	Good. Healing.	
2.	Mannel, G. Ueber die Tumoren des Douglasschen Raumes, Habil-Schrift. Marburg, 1864, p. 63.	Female.	Large as a pigeon's egg. Cystic tumour pressed flat. To the left between peritoneum and levator ani muscle.			Post-mortem preparation.
3.	Mannel, G. As No. 2.	Female.	Size of hen's egg. Cystic tumour, site as No. 2.			Post-mortem preparation.
4.	Deahna (Czerny's clinic). *Archiv. f. Gynäkol.*, 1875, vi, 305.	18. Nullipara. Violent abdominal pains. Trouble in urination and defæcation.	To the left behind rectum, reaching upwards for 3 ins. above symphysis pubis. Contents: Dermoid fluid with hairs.	Test puncture from rectum, two weeks later puncture and aspiration. Suppuration and enlargement of the cyst. Incision between anus and coccyx. Laceration in rectum sutured. Vesico-vaginal fistula.	Long-continued suppuration. Urinary fistula closed by operation.	
5.	Weinlechner. *Bericht der k. k. Krankenanstalt*, Rudolph Stiftung, in Wien. 1876, p. 298.	36. Female. Noticed for one year.	To the right, projecting in the region of the tuber ischii, two smaller dermoid cysts, the smaller a peripheral cyst, the larger twice the size of a man's fist.	Excision of smaller cyst. Peripheral part of larger one cut away. The basal part destroyed by saltpetre.	After two months there remained only a remnant, the size of half a walnut.	
6.	Solowjew. *Medizinskoje Obosrenje*, 1883. (*Cent. f. Chir.*, 1884, p. 96).	29. One abortion. Irregular hæmorrhages; nervousness.	On the left side behind rectum, filling the true pelvis.	Diagnostic puncture through the vagina. After a few days incision on the left of vagina extending to anus. Only partial removal from fear of injuring the peritoneum.	Cavity closed after two months. Occurrence of pregnancy.	
7.	Emmet. *Amer. Journ. of Obstet.*, 1884, p. 852.	22. Repeated attacks of pelvic peritonitis. Dysmenorrhœa.	Underneath peritoneum of Douglas' pouch.	Laparotomy. Extirpation. Left Fallopian tube also removed. Left ovary not found on account of adhesions		

No.	Author and Source.	Age, Births, Clinical Condition.	Size, Site, Consistence of Tumour.	Treatment.	Result.	Remarks
8.	Trzebicky. (Mikulicz's Clinic). *Wien. med. Woch.*, 1885, pp. 394 and 422.	35. Multipara. Noticed a tumour in gluteal region for 1½ years.	Larger than a child's head in the left gluteal region, consisting of two non-communicating parts. Hairs in contents.	Taken for a burrowing abscess. Extirpation after six weeks. The tumour had numerous diverticula.	Healing in 10 weeks. Closure of cavity by pressure with rubber balloon from the vagina.	
9.	v. Biernacki (Gusserow's Clinic). Eine retro-rectale. Dermoidcyste als Geburtshinderniss. *Dissertation*, Berlin 1887.	28. First pregnancy. Admitted in labour. Hindrance to birth.	Tumour between rectum and sacrum reaching down to 4 cm. above anus. Hairs in contents.	Puncture per rectum, forceps applied in vain. Craniotomy. Suppuration of cyst. Fistulæ formed behind vagina. Futile attempt to get at the suppurating focus by detaching posterior wall of vagina from the rectum. Later incision from rectum.	Discharged on 59th day. After another two months swelling of right nates. Incision. No pus. Good health thereafter.	B. mentions two cases of retro rectal cysts causing hindrance to birth. 1. Jackson, in *Puchelt.*, commentatio de tumoribus in pelvi partum impedientibus. Heidelberg, 1840. 2. Moller, R. Ueber Beckentumoren als komplication von Geburten, Diss. Berlin, 1869, 3rd case, p. 26.
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11.	Page. *B.M.J.*. 21 Feb., 1891, i, 406.	47. Seven births; two abortions. Twenty years ago, after the fifth birth, the tumour was noticed. In the last labour, 11 years ago, craniotomy was necessary.	Reaching to height of navel. Rectum pushed forward. Uterus elevated. Weight with contents 3 lbs. Hairs in contents.	Exploratory puncture from rectum gave diagnosis of dermoid cyst. Fever. Operation with 6 inch transverse incision midway between anus and coccyx. Extirpation.	Cure.	
12.	Schulze (Operator Krevet). *Deutsche med. Woch.*, 1895, p. 352.	33. Seven births; last birth very slow. Midwife noticed a tumour in fourth labour.	Two cysts; one, hen's egg size, above, the other, pigeon's egg size, below levator ani.	Exploratory puncture from anus. After two months at sixth week of pregnancy, operation with transverse incision midway between anus and coccyx. Extirpation of both cysts.	Uneventful recovery. Normal course of pregnancy and labour.	

No.	Author and Source.	Age, Births, Clinical Condition.	Size, Site, Consistence of Tumour.	Treatment.	Result.	Remarks.
13.	Hoefer (Fehling's Clinic). Ueber Dermoidcysten des Beckenbindgewebe. *Diss.*, Halle, 1896.	37. Three normal births, last one a year ago. Tumour noticed for six years.	Size of child's head, left gluteal region. Vagina displaced to the right. The tumour extended upwards between the folds of the broad ligament.	Exploratory puncture gave diagnosis of dermoid cyst. Perineotomy. Extirpation.	Fever in first few days. Cure.	
14.	Colonna. *Gaz. med. di Torino*, 1896, p. 200.	28. One birth normal, six years ago.	Rectum pressed to the right and forward. Spherical tumour reaching down to 4 cm., above anal orifice. Uterus pressed upward.	Parasacral incision. Extirpation.	Cure.	
15.	de Quervain. *Arch. f. klin. Chir.*, 1898, lvii, 129.	58. Male. Retention of urine false passage. Patient had used a catheter for 19 years. Fæces pressed flat.	Cyst lay close on sacrum, upper section of rectum pressed forward and to the right. To the front, the cyst took up the whole expanse of the true pelvis. Reached down as far as level of 3rd sacral vertebra upwards as far as one finger's breadth below navel.	Incision over Poupart's ligament, puncture of the cyst, drainage. After 3½ weeks, extraperitoneal detachment of the upper part of the cyst by way of the enlarged skin incision. After another three weeks, extirpation from parasacral incision.	Cure	
16.	Skutsch (1). *Zeit. f. Geb.*, 1899, xi, 353.	28. F. Multiple. Married at 20. Four children; one miscarriage nine months ago. Is four months pregnant. Pressure symptoms of bladder and rectum. Vagina and rectum pressed flat against sypmphysis pubis. Bulging of perineum, uterus raised.	Presacral cyst fillng true pelvis containing 1 litre of brownish thin fluid. Lined by squamous epithelium.	Partial extirpation through an incision 11 cm. long extending from a little way in front of labium majus to a point midway between anus and tuber ischii on left side.	Permanent fistula.	Pregnancy continued. Normal delivery.
17.	Skutsch (2).	22. Female. Multipara. One normal confinement 14 months previously; one miscarriage. Vagina pressed against symphysis pubis, rectum against right side of pelvic wall. Ovaries normal in size, and freely movable.	Immovable cyst filling left half of pelvis and part of right. Extends upwards to pelvic inlet and downwards to bulge perineum. Cyst lined by skin.	Extirpation with difficulty through a similar incision as in 18.	Cure.	

Adenomyoma of the Uterus with Tuberculous Infection.*

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THE liability of fibroids to various forms of degeneration is one of the commonplaces of gynæcological pathology, and is generally recognized as being due to the somewhat exiguous nature of their vascular supply, which is usually confined, or almost confined, to the capsule. The December meeting of our Society provided examples of two of the more rare forms of degeneration and infection in the specimens shown by the President of a sarcomatous degeneration in the centre of a fibroid polypus, and of a carcinomatous invasion of a fibroid. Microbic infections are much less frequent than degenerative changes except in polypoidal submucous fibroids which become exposed to the vaginal secretions. Infection of these may go on to sloughing and gangrene. Subserous fibroids may also be infected by adhesions to the bowel and to inflamed tubes, while a third possible route of infection is by the blood stream. Actual suppuration in fibroid tumours is, however, rare, for Lockyer, in his monograph, records experience of only three cases, whilst Kelly and Cullen found but four in 1,428 myoma cases. Tuberculous infection is one of the rarest varieties. Cullen records one case of an interstitial fibroid three inches in diameter which on section was of a putty-like consistence, and smears showed the presence of tubercle bacilli. Bôle records a case of what he calls a diffuse myoma of the anterior wall, which was partly necrotic and proved on microscopic examination to be tuberculous. The "diffuse" nature of the tumour makes one dubious whether it was not really an adenomyoma.

It would therefore appear that the capsule of a fibroid, which renders it prone to degeneration, protects it in some measure from microbic infection, except in the special anatomical conditions mentioned. If we keep these facts in mind, it is not surprising to find that, conversely, adenomyomata of the uterus, which are in the majority of cases diffuse and unencapsulated, and in which the glandular (endometrial) areas are usually more or less directly derived from the vascular uterine mucosa, should be comparatively

*Read at the February meeting of the Edinburgh Obstetrical Society.

immune from degenerations. On the same line of reasoning infection and malignant invasion might be expected to be more common in these tumours owing to the absence of a resistant capsule, more especially if we regard the development of the neoplasm as in itself a reaction to an infection. Experience, however, negatives such an expectation for we find that while cystic degeneration of adenomyomata is rare, malignant or infective changes are still rarer.

It is for these reasons that I wish to present to the Society to-night a case of adenomyoma of the uterus with widespread tuberculous infection, a condition of which, so far as I can find, only six cases have been recorded in medical literature.

The first two cases are recorded in von Recklinghausen's well-known monograph, which appeared in 1896, and which did so much to establish the recognition of adenomyoma as a pathological entity. The first case was that of a woman 44 years old, childless; menstruation had always been very profuse and painful, and for the four years prior to operation so abundant as to cause severe anæmia. The tumour was a little smaller than a fœtal head and was incarcerated in the pelvis, causing obstructive symptoms in the bladder and rectum. Examination of the tumour after removal showed it to be an adenomyoma with dilated gland spaces, and with "epithelioid tubercles" widely spread throughout the entire uterine wall, but especially favouring the adenomatous areas. In one portion of the tumour there were carcinomatous changes in the epithelium of the glandular elements, and the case thus presented a specially interesting combination of adenocarcinoma and tuberculous infection in an adenomyoma.

It is only fair to state that von Recklinghausen appears to have had some dubiety about this case, but his opinion has been generally accepted as the correct interpretation of the appearances found.

Von Recklinghausen's second case was that of a woman of 55, also sterile. She had come to her menopause in her thirtieth year and at the age of 45 there had been a malodorous hæmorrhagic discharge which returned at irregular intervals. The tumour was the size of a closed fist and a diagnostic curettage revealed carcinoma of the body of the uterus. Total extirpation of the uterus was performed and examination of the uterus showed that it not only contained carcinoma of the endometrium but was also the seat of adenomyoma, with "epithelioid tubercles" scattered throughout, and in many cases situated in the cellular mantle of the glandular areas.

The third specimen was recorded by Lichtenstern in 1901. The patient was a single woman of 22 who complained of dysmenorrhœa

at irregular intervals. Her uterus contained a tumour the size of an orange, and after its removal this was found to be an adenomyoma of endometrial origin with countless tubercles scattered throughout it. Lichtenstern was of opinion that the tuberculous infection was probably secondary to the adenomyoma.

The fourth specimen was described by Hösli in 1904. The patient was aged 44, and the tumour was found to be intraligamentous in situation. On examination it proved to be an adenomyoma with tuberculous giant-cell systems scattered throughout.

The fifth specimen was described by Archambauld and Pearce in 1907. The patient was aged 20, and was unmarried. There was only one case of tuberculosis in the family—a paternal uncle. Menstruation began at the age of 16, was always scanty and irregular, the intervals being always longer than usual, and sometimes as much as five or six months. Menstruation was not accompanied by pain. In December 1904 she was examined on account of an unusually prolonged period of amenorrhœa, and the uterus was found to be infantile in type, moderately retroverted, painless and movable, but accompanied by slight inflammation of the appendages. Six months later the patient suddenly developed hæmoptysis, and for more than a year was treated in sanatoria for pulmonary tuberculosis. In November 1905, 11 months after the previous examination, an attack of pelvic pain determined a second examination, when the body of the retroverted uterus was found to be enlarged to the size of a mandarin orange, and on the left side, and apparently continuous with the uterus, was another mass with a soft-solid consistence. A diagnosis of pelvic tuberculosis was made, and an operation performed in January 1906. After separation of many adhesions the uterus, as large as an orange, together with the appendages on both sides, was removed, the patient making a good recovery. On examination, the posterior wall of the uterus was found to contain a rounded tumour, which proved to be an adenomyoma riddled with tuberculous nodules, many of which were caseating. Tubercles were also present in the right Fallopian tube, but not in the left. No tuberculosis was found in the endometrium, even that portion of it bordering the tumour. Pearce, who was responsible for the pathological examination, states that there was nothing to indicate that the glandular elements and prolongations had been the route of entry of the tuberculous disease which was disseminated apart from the adenomatous elements.

The sixth case occurred in Landau's clinique in Berlin, and was very fully studied by Grünbaum, to whose paper in the *Archiv. für Gynäcologie* in 1907 I am indebted for several of the references to previous literature. The patient was 45 years of age, married, and had never been pregnant. Fifteen years before the operation she

ı treated for a pulmonary catarrh with cough and /sis. After one and a half years of treatment the patient ɔd completely and felt absolutely well. Five years before on she experienced a feeling of weight in the pelvis, and a ır of the uterus was diagnosed, but the patient refused ıtion. The monthly periods were regular and profuse, but .out any special pain. However, a year before operation the ıent experienced increasing pain on micturition, and ultimately ..ficulty in the evacuation of the bladder amounting to actual retention and necessitating catheterization. This led her to submit to operation, and a uterine tumour, the size of a child's head, was removed by hysterectomy. On examination, the tumour proved to be a diffuse adenomyoma, the glandular portions of which were here and there dilated into small cysts. Close to the normal gland tissue in the lymph-adenoid stroma were "epithelioid tubercles" with multi-nucleated giant-cell systems. Some of these tubercles were caseating in the centre. The tuberculous infection was present also in the endometrium and in the superficial portion of the muscular wall of the uterus, and Grünbaum remarks that in some places there existed, in close proximity to intact and healthy endometrium, areas riddled with tubercles degenerating to the extent of complete necrosis and caseation. The cornua and the interstitial portions of the tubes showed changes suggestive of adenomyoma (or of salpingitis isthmica nodosa), but no clear evidence of tuberculosis was to be found in any part of the tubes. Grünbaum draws attention to the fact that the tuberculosis was most advanced in the portion of the tumour furthest removed from the cavity of the uterus and had produced widespread caseation in the peripheral layers which were evidently part of the adenomatous tumour. The muscular tissue had suffered least from the tuberculosis. The absence of any tubal infection is remarkable, as the Fallopian tubes are universally recognized as being the parts of the generative organs in the female most susceptible to tuberculous infection. Grünbaum regarded his case of adenomyoma as almost certainly of true endometrial origin, and the tuberculous infection as secondary to the tumour growth, believing that the adenomatous processes favoured the progress of the tuberculosis from the endometrium into the tumour. In favour of this view he adduces the arguments that (1) large areas of the tumour were free from tuberculosis, in particular the tubal angles and the tubes themselves; (2) tuberculosis of the endometrium has not been known to produce deeply sunk tube-like glandular swellings. He regards the case as one of a blood-borne infection from an old latent focus in the lung.

Except for these six cases I have not been able to find any other record. Cullen, in his immense experience of adenomyoma, does

not appear to have met with this complication; and Lockyer, in his book on "Fibroids and Allied Tumours," records only a case of adenomyoma of the uterus associated with tuberculous salpingitis, in which, however, the uterus and tumour were uninfected.

My own case is that of Mrs. R., aged 45, who was sent to Ward 36, Royal Infirmary, as an out-patient in September 1923, by Dr. Margaret Cameron, of Portobello. The patient had been married for 21 years, but had never been pregnant. Her menstruation began when she was 12, and had been regular, 3/21. In her youth the periods had been profuse, but for the last 20 years the amount of loss had been normal. Nineteen years ago she had some pain down in the left side associated with a yellow discharge. This was treated by douching and with a ring pessary (*sic*), and her symptoms disappeared. In July 1923 she began to suffer from pain low down in the right side, radiating round to the back, and so severe as to interfere with her sleep at nights. Her general health has been satisfactory, although she has had an occasional winter cough. Her father died at the age of 39 from hæmoptysis, but apart from this there is no history of tuberculosis in the family,—two brothers and five sisters being alive and well. Two sisters died in infancy. On examination, the uterus was found to be lying in marked anteversion and enlarged to the size of an orange. A diagnosis of fibroid tumour was made, and the abdomen opened on September 27. The uterus contained what appeared to be two interstitial fibroids side by side on the posterior wall. The left tube was slightly thickened and nodular towards its uterine end. Otherwise the appendages appeared normal. Supravaginal hysterectomy was performed with double salpingo-öophorectomy. The patient made an excellent recovery, complicated only by a few days of slight cough with sticky sputum, harsh vesicular breathing at both apices, and some few crepitations at the bases. The sputum did not show the presence of any tubercle bacilli. The temperature, which never exceeded 100°F., fell to normal on the seventh day and did not again rise. She left hospital on the twentieth day after operation in good health, and has since reported twice as feeling very well and being free from pain or other symptoms.

At the close of the operation I examined the specimen to see if there was any degeneration which would account for her pain. On incision the larger of the two tumours showed numerous small yellow areas, soft in consistence, studded throughout a very coarse-looking fibroid. The condition was obviously abnormal, and I asked the University Gynæcological Laboratory for an early report upon it. I am obliged to Dr. Douglas Miller for giving me this report, which was to the effect that the tumour was adenomyomatous in nature, and that the cellular stroma surrounding the gland

had been treated for a pulmonary catarrh with cough and hæmoptysis. After one and a half years of treatment the patient recovered completely and felt absolutely well. Five years before operation she experienced a feeling of weight in the pelvis, and a tumour of the uterus was diagnosed, but the patient refused operation. The monthly periods were regular and profuse, but without any special pain. However, a year before operation the patient experienced increasing pain on micturition, and ultimately difficulty in the evacuation of the bladder amounting to actual retention and necessitating catheterization. This led her to submit to operation, and a uterine tumour, the size of a child's head, was removed by hysterectomy. On examination, the tumour proved to be a diffuse adenomyoma, the glandular portions of which were here and there dilated into small cysts. Close to the normal gland tissue in the lymph-adenoid stroma were "epithelioid tubercles" with multi-nucleated giant-cell systems. Some of these tubercles were caseating in the centre. The tuberculous infection was present also in the endometrium and in the superficial portion of the muscular wall of the uterus, and Grünbaum remarks that in some places there existed, in close proximity to intact and healthy endometrium, areas riddled with tubercles degenerating to the extent of complete necrosis and caseation. The cornua and the interstitial portions of the tubes showed changes suggestive of adenomyoma (or of salpingitis isthmica nodosa), but no clear evidence of tuberculosis was to be found in any part of the tubes. Grünbaum draws attention to the fact that the tuberculosis was most advanced in the portion of the tumour furthest removed from the cavity of the uterus and had produced widespread caseation in the peripheral layers which were evidently part of the adenomatous tumour. The muscular tissue had suffered least from the tuberculosis. The absence of any tubal infection is remarkable, as the Fallopian tubes are universally recognized as being the parts of the generative organs in the female most susceptible to tuberculous infection. Grünbaum regarded his case of adenomyoma as almost certainly of true endometrial origin, and the tuberculous infection as secondary to the tumour growth, believing that the adenomatous processes favoured the progress of the tuberculosis from the endometrium into the tumour. In favour of this view he adduces the arguments that (1) large areas of the tumour were free from tuberculosis, in particular the tubal angles and the tubes themselves; (2) tuberculosis of the endometrium has not been known to produce deeply sunk tube-like glandular swellings. He regards the case as one of a blood-borne infection from an old latent focus in the lung.

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elements was infiltrated with tuberculous giant-cell systems. This report, together with the slight pulmonary symptoms which occurred during her convalescence, determined a further examination of her lungs, and Dr. Fergus Hewat, who kindly saw her with me, was able to detect some dullness and shrinkage of the lung at the right apex. He was of opinion that this was probably due to old-standing tuberculosis, but at the time of his examination he could detect no traces of any active disease.

The uterus contains two swellings in its posterior wall, the larger, on the left, being about the size of a plum. Both tubes are thickened throughout and present nodular thickenings in addition, which are most marked at the cornu on each side. Other minor thickenings in the isthmus and ampulla in each tube can be felt between the fingers better than they can be seen. The tumours on the posterior wall have the structure of a diffuse adenomyoma and are infiltrated with tuberculous nodules and giant-cell systems. The distribution of these appears to be mainly, but not exclusively, in the cellular mantle of the glandular elements. Both the glandular areas and the tubercles are most numerous in the left and larger tumour, and the tuberculous infection is most noticeable in the part of the tumour nearest to the endometrium and the cavity of the uterus.

The section, which includes part of the endometrium, shows clearly the inflowing of the endometrium into the myomatous tissue, and proves the endometrial origin of this adenomyoma. It also demonstrates very beautifully how the mucosal elements seem to flow like streams along the paths of least resistance, opening out into lakes or pools with cystic spaces where opportunity permits. This low-power section has thus an appearance which is somewhat reminiscent of a contour map of a well-watered countryside. (Fig. 2).

The anterior wall is one inch thick but shows no clear evidence of adenomyoma and the demarcation between mucosa and muscularis is normally defined. A few tubercles are present in the endometrium, and in the inner portion of the muscular wall there are several lymphoid nodules of round cells containing tuberculous multinucleated giant cells. I have not found any trace of gland invasion in the sections taken from the anterior wall.

Tubercles are present in the cornual swelling of the left tube which presents many cystic spaces lined with glandular epithelium, but with little or no cellular stroma around them. This is characteristic of salpingitis isthmica nodosa, and also, according to Sampson, of adenomyoma growing from the tubal epithelium. The two conditions are probably often confused. Sections of one of the thickenings in the outer isthmic region of the right tube show one or two similar cystic spaces in addition to the tube lumen,

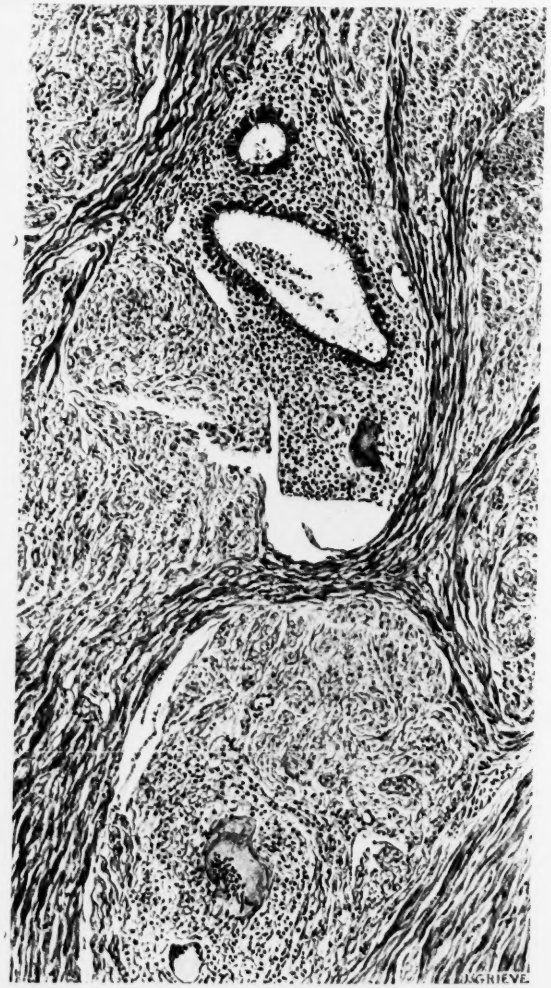

Fig. 1. Photograph of a drawing of portion of tumour (H.P.), showing structure of adenomyoma and presence of tuberculous giant-cells in the cellular stroma.

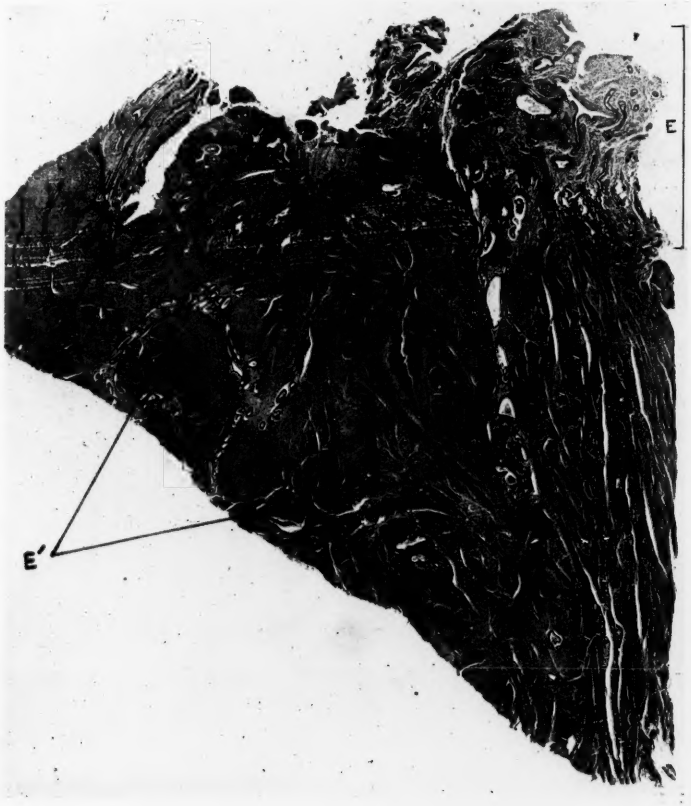

Fig. 2. Low power view of section from posterior wall of uterus, including normal endometrium at upper right-hand corner (E), and portion of tumour. The lines drawn from E′ show ingrowths of endometrium running up into the tumour, which prove the mucosal origin of the glandular areas in the tumour.

There is no clear evidence of tubercle in the right tube but there are a few nodular collections of round cells which are strongly suggestive of it.

Here then is a uterus presenting simultaneously (1) two diffuse adenomyomatous tumours in its posterior wall, which are clearly of endometrial origin, and (2) disseminated tuberculous infection, alike of the endometrium, the muscular wall, the tumour growths, and certainly the left tube—possibly also the right. The question naturally arises whether the two conditions have more than a fortuitous association. The presence of glandular invasion in the cornua is of special interest in this connexion, whether we interpret it as adenomyoma arising from the tubal epithelium, or as "salpingitis isthmica nodosa."

In regard to the present specimen, the main point to be considered is the origin of the tuberculous infection—was it a descending infection through the tubes, or a blood-borne infection? The possibility of an ascending infection from the cervix may be almost discarded. Archambauld and Pearce, and also Grünbaum, regarded the glandular elements of the adenomyoma in their cases as presenting areas of diminished resistance which determined the settlement in them of tubercle bacilli circulating in the blood. The two former writers quote Schakoff's article on "Tuberculosis of the Female Genital Organs" to the effect that firstly, "genital tuberculosis in women is usually secondary, most commonly to pulmonary tuberculosis"; and secondly, "in tuberculosis of the uterus and ovaries, when the tuberculous lesions exist as isolated foci without neighbouring lesions, the inoculation has occurred by the blood stream."

I am not disposed to challenge these axioms, which indeed seem thoroughly rational; and this case of mine would appear to support them for the following reasons. Firstly, there is no trace of any peritoneal tuberculosis in the specimen removed, nor, secondly, was there any sign of peritoneal involvement seen at the time of operation; and thirdly, the tuberculous infection is much more marked in the uterus than in the tubes, a point which would seem to exclude invasion of the uterus by the route of the mucous surface. I would regard this therefore as in all likelihood a blood-borne tuberculous infection, secondary to some old-standing tuberculous focus in the lungs, which has settled more in the endometrium of the body of the uterus than in the tubes. From the endometrium it seems to have passed into the wall of the uterus, and judging from the much greater prevalence of the tubercles in the cellular mantle around the gland elements of the tumour, as compared either with the endometrium or with those portions of the wall of the uterus not affected by the tumour, it seems legitimate to argue

that the glandular prolongations into the adenomyoma have provided the tuberculous disease with a ready access to the tumour, and have indeed proved to be areas of a diminished resistance which has determined the settlement of tubercle bacilli in them.

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Ætiology and Prognosis of Puerperal Insanity.

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It is well known that those morbid conditions which lie on the border line of two specialities of medicine, and may therefore be claimed by both groups of workers, are in danger of neglect because each repudiates the responsibility of special study. In other cases we find that any given disease may be closely observed and viewed from the different aspects of two special branches of medicine, but there is lacking sufficient co-ordination between the two to present the condition as one undivided whole. For example, the affections of the thryoid gland are of interest to both the physician and the gynæcologist, but each is apt to regard the condition from his own point of view only.

The ætiology and prognosis of puerperal insanity is another instance of the tendency for incomplete study or neglect of a point of contact between two groups of special workers. By the analysis of about 60 cases of puerperal insanity I have made an attempt to define the obstetrical relationships in both ætiology and prognosis.

In addition to a few cases of my own I have collected the notes of others from Queen Charlotte's Hospital and Paddington Hospital, and I am indebted to the resident medical officers of St. Thomas's and the General Lying-In and the City of London Lying-In Hospitals, for sending me further reports.

The chief difficulty in producing any account of the subject has been the inadequacy of the clinical notes. While these records have frequently supplied detailed descriptions of the labours, there have been only the scantiest details of the insanity or any factors of ætiological importance. An additional difficulty in analyzing the records is that these patients have been quickly transferred from the lying-in hospital to an infirmary at the earliest signs of mental disturbance. It has been necessary to trace nearly every case to the infirmary, whence, again, after a short stay they have been moved to various asylums. By following them up to the asylums it has been possible to obtain in a large number a fairly complete

account of their subsequent history, while in a few cases I have succeeded in tracing the patients to their homes after so long a period as 12 years.

Ætiology.

Sufficient ætiological details have been forthcoming in 61 cases. In few instances have there been furnished full accounts of antecedent conditions, but it is clear that physical puerperal diseases have played a large part as exciting causes. How far they have been only exciting causes operating upon patients already predisposed to mental disease either by congenital feeble-mindedness or by some hereditary taint it is impossible to be certain, but from my survey of the cases I have the impression that as a rule physical disease has been a sufficient factor even in the absence of any tendency towards insanity. This is not true of all cases, however, as I have notes of patients who have indicated a mental instability by such histories as a mental breakdown at puberty, and repeated insanity with successive confinements, but it is true in general that those patients with serious physical disease do not appear to have had a bad family or individual history. In some cases the notes have been sufficiently detailed to make it clear that no obvious cause could be traced. In nine of the 61 patients no cause of any kind of insanity was apparent. Five were single, and four were married. It is possible that pregnancy in the single state may have induced a constant and severe anxiety which caused mental exhaustion and finally a breakdown at the stress of labour. This view gains support from the fact that the single patients amounted to so high a figure as 36 per cent. of the whole. It might be argued that mentally feeble single women are more liable to become pregnant than those of sound mental health, but that is not borne out by the figures. For example, of 12 patients with previous mental trouble or a bad family history, only one was single. We may suggest, therefore, that the worry of an illegitimate pregnancy may have an important bearing on the incidence of puerperal insanity in single women.

The chief organic disease associated with insanity is one of the many forms of puerperal sepsis. Uterine infection, with or without blood infection, accounted for 18 out of 61, or 27 per cent., and of these 18, 13 were serious, some of them proving fatal. High fever from any cause is liable to provoke a certain amount of mental aberration, but it quickly passes with the fall of temperature. In insanity associated with puerperal sepsis we find that the mental trouble lasts many months after the fever has subsided.

Five of the 18 cases were described as being only of slight

degree, and it is doubtful how far sepsis was an exciting cause. There were three cases of severe and persistent pyelitis, while rheumatic infection and cardiac disease was noted in one case, and severe influenza in another.

After uterine infection the next most important organic disease was eclampsia. Of the 61 confinements there were nine cases of eclampsia, or 13.5 per cent., in all of which, according to the notes, the patients were married. It is well known how eclampsia causes mental symptoms usually in the direction of coma during the acute stage, sometimes accompanied by violent restlessness. In one of my own cases, as the coma passed off the restlessness increased until the patient had to be controlled by four or five nurses before she could be removed from Queen Charlotte's Hospital in a condition of violent mania. Another of my eclamptic patients passed from her state of coma, in which there was no restlessness, into a condition of stuperose melancholia with an aversion for the baby, from which she recovered in two or three weeks.

The character of the labour, that is, whether it was normal, difficult and complicated, appeared to have no ætiological significance. Of 65 confinements of which details were given, there were eight cases of difficult labour (12 per cent.) with various conditions, including severe hæmorrhage, manual dilatation of the cervix and extraction with the forceps. Several of these patients appear in the category of infection, to which the insanity was probably due.

Primigravidæ formed a much larger proportion of the total than multiparæ, namely, 59 per cent., while second labours formed 14 per cent., third labours 8 per cent., and those confined for the fourth or more times accounted for 19 per cent.

Passing now to the influence of an unstable mental equilibrium and a bad family history, there are 18, or 27 per cent. Thus of all the cases more than one quarter give signs of a predisposition to mental disease. If the notes had been more detailed it is probable that this figure would have been higher.

Four of the 18 patients were epileptic, of whom three were single women. In four there was a history of previous sojourns in an asylum, while five had suffered puerperal insanity after previous confinements, and five came of a stock in which insanity had appeared in former years.

There were one or two patients who had suffered from great anxiety during pregnancy, one on account of the development of phthisis, and one whose husband was reported missing in the war. It is probable, as perhaps in the case of illegitimate pregnancy, that a severe anxiety had contributed to the mental disease after the confinement. A third patient, whom I saw, had had previous mental trouble for a short time at puberty, and during her second

pregnancy had undergone a great deal of constant household trouble which caused her to give way to fits of temper. Her first pregnancy and confinement had been uneventful. I believe this patient illustrated the effect of anxiety during pregnancy on one who had previously shown symptoms of mental instability.

To sum up we can say that puerperal organic disease, particularly sepsis and eclampsia, is capable of provoking insanity in patients who have not hitherto shown, either in themselves or their families, any evidence of mental weakness. In a few cases insanity supervenes without any obvious cause, though I believe that in some a closer examination would reveal signs of a predisposition.

Pregnancy and labour obviously throw a real strain on the mental constitution of the patient as well as the physical, inasmuch as in 27 per cent. of the cases it provoked the onset of insanity in those showing a mental taint.

Time and Manner of Onset.

Of 64 cases, four developed insanity during the latter part of pregnancy. Of these four patients, one was feeble-minded, a second showed no physical disease. Both were melancholic and stuperose, and are still in asylums. A third patient became insane during pregnancy, while some obscure fever with meningeal symptoms developed. After labour she grew worse, but was declared not to have true meningitis. She died within a few weeks. The fourth case thought she had phthisis which caused her great anxiety and rendered her melancholic, but she recovered her mental equilibrium in two months after delivery.

Six patients became mental during labour, of whom some were eclamptic, 39 cases showed the first symptoms during the first week, and only 18 were first affected during the second week. Three cases became insane from three to six weeks after delivery, of whom one had a collateral history and has been in an asylum twice since her confinement. The other two cases suffered from prolonged and severe sepsis, one of whom died.

The incidence of insanity was equally common on the third to the seventh days, while only one case is reported on the second day.

The manner of onset was very similar in the great majority. There had usually been some nights of sleeplessness, after which the patient was described as being "peculiar," inasmuch as she talked with a little incoherence which showed some deep-seated anxiety. From this indefinite state she quickly developed more obvious symptoms, such as aversion for food and her baby, and delusions that she was being poisoned or given chloroform, or that

the baby was not her own. Becoming more and more agitated and restless, by the second day she was trying to get out of bed, exposing herself or making spiteful attacks on nurses. Most of the cases were maniacal within three days, constantly screaming and throwing their limbs about. A lesser number became depressed and stuperose, or morbidly religious, with intervals of weeping and hymn-singing.

Results.

Sufficient details of the after histories have been obtained to show a mortality of 13 patients out of 58 (22 per cent.). Of the 13 fatal cases, six died of the effects of infection, while two died by self-destruction, jumping out of the window; two died of cardiac failure, one after 18 months in an asylum; while the cause of death of the remainder was not given.

It is clear, therefore, that puerperal insanity is a serious indication of the severity of the organic disease which causes it. Since the compilation of these figures I have seen another case of long-standing streptococcal pyelitis who became insane and died soon after.

I have been able to trace 36 patients who survived. The ultimate result is described as "Recovered," "Relieved" or "In Statu Quo.".

Of the 36 patients, 28 (78 per cent.) have been discharged from asylums or infirmaries after a varying time as "recovered," while four were "relieved." Occasionally a patient described as "relieved" has been re-admitted to the asylum because of a further attack of insanity.

Four patients are still in asylums in a chronic condition of insanity.

Comparing the cause and variety of insanity with the ultimate result, we find that six out of seven patients in whom there was no obvious ætiological factor, recovered, and four others, of whom nothing was stated, also recovered. The one case, who is in a persistent stuperose amnesic condition, was a married woman who developed melancholia during pregnancy, and was delivered of her first child only 18 months ago. There was no organic disease discovered either in the infirmary or asylum.

There were 13 cases of uterine infection traced; of these six died and seven recovered. Three of these recovered mentally after 19, 18 and eight months respectively, while the other four patients were discharged after only a few weeks.

Six cases of eclampsia who have been traced have all recovered, which is a result, I believe, in accordance with everybody's experi-

ence of eclamptic insanity. The majority of these recovered in a few weeks, while two were in the asylum for six and nine months respectively.

I have been able to trace only nine patients who had had previous attacks of insanity or a bad family history; of these, three recovered, three were relieved, and three are still confined in the asylum.

Those who are only relieved or *in statu quo* are described as "feeble-minded" (one), epilepsy (one), one who had had an attack at puberty, two who had previously sojourned in asylums, and one with a collateral history of insanity.

The time before recovery varied from two weeks to three years, the average time being six and a half months. The eclamptics, as already stated, tended to rapid recovery, but apart from this disease there is little co-relation between cause and length of time in the asylum.

Those patients who remained insane for the longest period, that is, for about a year or more, were chiefly those either with no obvious ætiological factors, or only very slight conditions, such as mild pyrexia during the puerperium, while those with an hereditary factor who recovered became normal in less than six months. The details of the variety of insanity were not sufficiently precise to yield any basis for formulating a prognosis. Those described as having mania, melancholia or acute confusional insanity, all varied within wide limits in the duration of the disease and ultimate result.

Summing up our evidence of the prognosis of puerperal insanity, it is possible to say that it, firstly, depends upon the severity of the organic disease. Half of the fatal cases died of some variety of infection, while of those cases of infection of which later details are available, half died. Eclampsia, on the other hand, tends to produce only a brief period of insanity.

The majority, that is 77 per cent. of the survivors, recovered their mental health, though it is probable that many of these might again become insane should they be subjected to another stress such as pregnancy and labour. It is impossible to give any figures of the liability to repetition of puerperal insanity from my notes, but from letters received from patients' husbands and asylum reports, it seems clear that if a patient, having had previous attacks or a collateral history of insanity, becomes pregnant subsequently, she will be prone to become again insane, as happened in five of these cases, but should insanity be only a symptom of a serious organic disease such as puerperal sepsis or eclampsia, the probability is that it will not recur in a future puerperium.

It has only been possible to produce the few facts I here relate by the kindness and courtesy of the medical superintendents of

the infirmaries and asylums. In every instance I have had prompt and detailed replies to my letters of enquiry, which have involved searching infirmary and asylum records for as much as 20 years. I should like to mention particularly Dr. Thane Taylor, of the Holborn Institution; Dr. A. H. Bayly, of the Lambeth Hospital; Dr. Bendle, at Paddington Hospital; Dr. Basil Hood, of the Marylebone Hospital; and Dr. Thackray, of St. Pancras Hospital. Also Dr. Littlejohn, of the Manor Asylum, Epsom; Dr. Beresford, of Tooting Bec; Dr. Martin, of Long Grove, Epsom; Dr. Porter Phillips, of Bethlem Royal Hospital; Dr. Barham, of Claybury; Dr. Gilfillan, of Colney Hatch; Dr. H. Roberts, of Horton; Dr. Spark, of Banstead; and Dr. Daniel, of Hanwell Mental Hospital.

An Investigation of the Bacteria of the Vagina in Pregnancy.

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THE importance of bacterial infections in the complications of pregnancy and the puerperium has led to many investigations of the organisms present in the vaginal secretion of pregnant women. There is, however, no consensus of opinion, and the results of the various workers have been contradictory to one another.

In 1887 Gönner published a paper in which he stated that the vaginal secretion of pregnant women did not contain the bacteria usually found in cases of puerperal infection, although it did contain large numbers of bacteria, seen in direct films, but which would not grow on culture media. He believed the vaginal secretion contained no pathogenic bacteria.

Döderlein's monograph was published in 1892. In this paper he described the large Gram positive faculatively anærobic bacillus which bears his name. He also noted its frequent association (39 per cent. of cases) with the yeast fungus.

From the examination of 195 pregnant women Döderlein divided the cases into those having a "normal" vaginal secretion and those with a "pathological" secretion. The secretion of about 50 per cent. was normal in character, described as whitish in colour, thick like curdled milk, and very acid in reaction. The so-called "pathological" secretion was only slightly acid, or in some cases alkaline in reaction, was yellowish or greenish in colour, thin in consistence and sometimes contained gas bubbles.

Microscopically, the "normal" secretion contained epithelial cells, some leucocytes and long, thick, non-motile, Gram positive bacilli which grew anærobically and ærobically on glucose agar, forming minute translucent colonies like "dew drops" on the medium. Döderlein showed that this bacillus produced lactic acid and was antagonistic to the growth of staphylococci. He considered that the bactericidal action of the vaginal secretion was due to the acid produced by this bacillus.

The "pathological" secretions showed a great variety of cocci and bacilli. Of the 195 cases, eight showed streptococci, and of these five only were shown to be virulent. He concluded, therefore,

that the "normal" secretion of the pregnant woman does not contain pathogenic bacteria, but the "pathological" secretion, in a certain number of cases, is shown to contain streptococci and staphylococci.

Krönig, in 1894, examined the secretion from 200 cases. Apart from the gonococcus, he found no pathogenic organisms. His observations were supported by Bumm, Menge and others. On the other hand, numerous observers have reported, in a large proportion of cases, pathogenic organisms—streptococci, staphylococci and b. coli—in the normal secretion.

In 1912, Joeten reported 100 cases, with streptococci in 67.

Williams, in 1898, in view of the conflicting statements of different investigators, examined 92 cases, using Krönig's technique for obtaining the secretion, Krönig having stated that the positive results of most observers were due to faulty technique in obtaining the secretion for examination. He maintained that, by inserting a speculum into the vagina, they introduced from the vulva the bacteria which later they found in their cultures. Williams was unable to cultivate streptococci from a single case, and found staphylococcus albus in only two cases.

The technique he employed was as follows: After swabbing the orifice of the vagina, Menge's apparatus was introduced into the vagina and the secretion collected. Menge's apparatus consists of a nickel-plated tube 25 cms. in length and 4 or 5 mm. in diameter, closed at one end. Just above the closed end is a fenestrum, 2 cms. long, which includes about half the periphery of the tube. Within this tube fits a second tube, the upper end of which is provided with a handle, whilst its lower end is so arranged as to close the fenestrum, when it is pushed down within the outer tube, and to open it when it is drawn up. After sterilization, the closed instrument is introduced into the vagina, the fenestrum is then opened and the secretion scooped up, by giving it a rotatory movement, after which the fenestrum is closed and the tube withdrawn.

By this means one is able to obtain secretion which has not been contaminated by bacteria from the entrance of the vagina, whereas, it is more than probable, contamination will occur, if a speculum is used for obtaining the secretion. Williams made the following experiment:—From each of 25 pregnant women he removed—

(1) Some secretion from the margin of the hymen and inner surface of the labia.

(2) Secretion from the vagina by means of a Menge's tube.

(3) Secretion from the vagina by means of a sterilized speculum.

From each of these secretions direct films and cultures were made.

Pyogenic bacteria were found in the vulval secretion in 76 per cent., in the secretion obtained by means of the speculum in 48 per cent., and were altogether absent in the secretion obtained by the Menge's tube.

Williams' work, therefore, seems to confirm the previous work of Gönner, Krönig, Menge and others that the various pyogenic bacteria which cause puerperal sepsis, are not present in the normal vaginal secretion of pregnant women in the Obstetrical and Gynæcological Unit of the Royal Free Hospital during the years 1921 and 1922.

The present investigation was carried out with the following objects :—

(1) To confirm or to refute this opinion.
(2) To prepare a vaccine, to be given to pregnant women, as a prophylactic against puerperal sepsis, should pyogenic organisms be found in the normal secretion.

The vaginal secretions of 98 pregnant women, attending the ante-natal clinic of the hospital, were examined. The majority of the patients were 20 to 40 weeks pregnant, and were later confined in the hospital. The character of the puerperium in each case could thus be followed.

The secretion was obtained by means of a Menge's apparatus, using Krönig's technique.

In any case in which the presence of the gonococcus was suspected a separate swab was taken from the cervix (after obtaining the vaginal secretion) for a smear preparation.

The Menge's tube was removed to the laboratory as soon as possible, and the secretion examined. The general appearance was noted, its reaction tested and direct films made from it. It was then inoculated upon the following media—broth-ærobic glucose agar (containing 1 per cent. glucose, slightly acid in reaction), agar and anærobic glucose agar. The direct films were stained routinely by Gram's method.

Twenty-four hours after incubation the cultures were examined and films made. In those cases in which more than one type of colony was present sub-cultures were made on suitable media. The secretions varied considerably in appearance, but it was not found possible to divide them into "normal" and "pathological," according to Döderlein's description.

In 67 of the cases examined the secretion was colourless or creamish in colour, rather thin in consistence (not thick and cheese-like as described by Döderlein), acid in reaction, and usually more profuse than in healthy non-pregnant women. Secretions answering this description were considered normal.

Fig. 1. Direct film showing vaginal epithelium and typical vaginal bacilli.

Fig. 2. Film from culture on glucose agar, Case 25, showing "involution" forms of the bacilli.

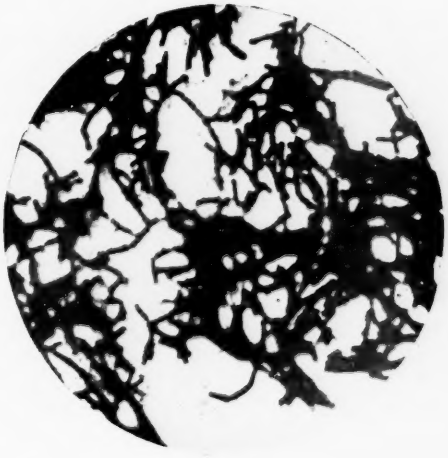

Fig. 3. Film from a culture seven days old. Involution forms forming whorled masses resembling a streptothrix.

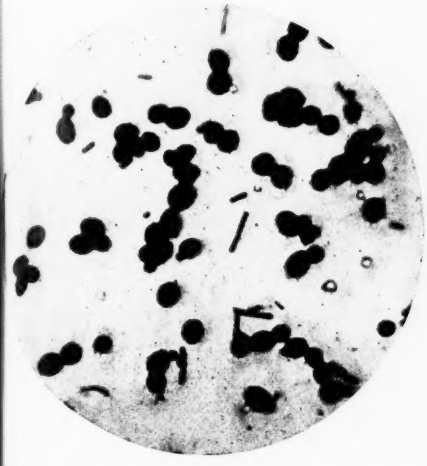

Fig. 4. Film from a culture on glucose agar, Case 14, showing yeast and vaginal bacilli.

Fig. 5. Film from a broth culture from Case No. 50.

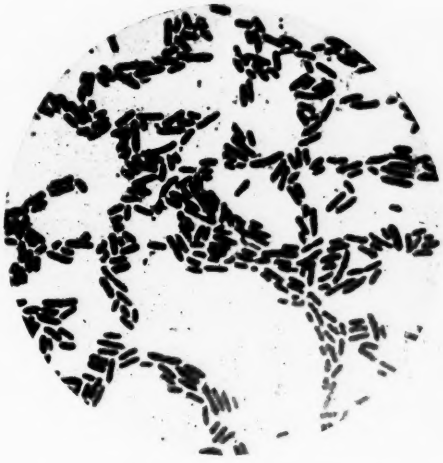

Fig. 6. Film from a culture on glucose agar from Case No. 86.

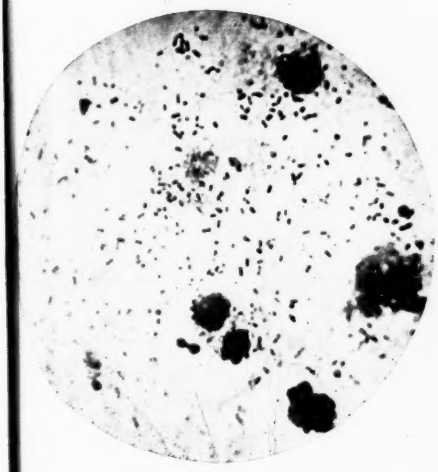

Fig. 7. Direct film from Case No. 81 showing ry small cocco-bacilli.

Fig. 8. Direct film from Case No. 59 showing diphtheroid grouping of the bacilli.

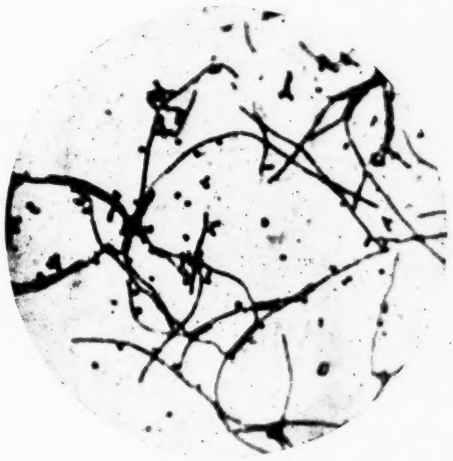

Fig. 9. Culture on glucose agar from Case 61 (seven days old). Some of the involution forms show evidence of segmentation.

In 31 of the patients the secretion was yellowish in colour, profuse, muco-purulent or purulent, and was considered " pathological."

In one case gas bubbles were noted, but a gas-producing organism was not isolated.

The reaction of the secretions in all cases except two were acid, but in some this was more strongly marked than in others.

It was possible, after some experience, to predict fairly accurately the secretions that would be likely to contain organisms, other than b. vaginalis and yeast, but in a few of the apparently " normal " secretions, cocci and other types of Gram positive bacilli, differing considerably from b. vaginalis, were found.

An analysis of the direct films from the cases with a " pathological " secretion shows that in all but one case, in which b. vaginalis only was present, the following bacteria were identified :—

Streptococci	2
Staphylococci	6
Gram positive diplococci	10
Gonococci	3
Very short Gram positive bacilli with round ends ...	13
Diptheroid bacilli	2
Gram negative bacilli	2
B. vaginalis	1

In some cases two or more organisms were present, *i.e.*, in over 96 per cent. of the secretions considered " pathological," organisms other than b. vaginalis and yeast were present.

Of these organisms cocci were identified in 68 per cent. of the cases.

In the case of the secretions considered " normal " the following bacteria were found :—

Staphylococci	3
Gram positive diplococci	4
Diptheroid bacilli	1
Very short Gram positive bacilli with round ends ...	15
Slender Gram positive bacilli with " spore "-like body at one end	2
Thick Gram positive bacilli with round ends	1
B. vaginalis	30
B. vaginalis and yeast	9
Gram negative bacilli	1

i.e., in 40 per cent. of the secretions considered " normal," organisms, other than b. vaginalis and yeast, were present, but of

these in only 10 per cent. were cocci found, streptococci and gonococci were not identified in any of these cases.

It will thus be seen that no hard and fast line of demarcation between a normal and a pathological secretion can be made, but the majority of normal secretions contain only the vaginal bacillus, whereas the majority of the "pathological" secretions contain other bacteria.

The cultural findings in many cases differed considerably from the direct films—three or four varieties of bacteria, cocci and bacilli may be noted in the direct films, and yet the culture media contain colonies of only one or two types.

In some cases, in which Gram positive cocci were found in direct films, almost like a pure culture, there was complete absence of growth on the culture media. In two cases only, Nos. 3 and 70, were cocci resembling streptococci found in the direct films. Of these, one only, No. 70, grew on the culture media.

1 cc. of this broth culture was inoculated subcutaneously into a rat by Miss Evelyn Hewet, D.Sc. (Lond.), at the London School of Medicine for Women. It produced neither local nor general reaction.

Staphylococci were grown in 16 cases. Of these, 13 had the cultural appearances of staphylococcus albus, three of staphylococcus pyogenes aureus (cases 54, 55 and 64). In each case 1 cc. was inoculated into a rat, but no local or general reaction followed.

The vaginal bacillus (Fig. 1) was found to grow in a certain number of cases, both on anærobic and ærobic glucose agar, forming minute translucent colonies. After three or four days' growth, the organisms showed the "involution" forms described by Döderlein (Fig. 2). In some cases, after six or seven days, these involution forms had the appearance of a streptothrix (Fig. 3).

Gram negative bacilli were detected in direct films in two cases, but did not grow on the culture media. In addition to the vaginal bacillus, several other types of Gram positive bacilli were cultivated. See figs. 4, 5, 6.

The pathogenicity of these bacilli, as far as possible, was tested by injecting 1 cc. of a broth culture of the bacillus subcutaneously into a rat. In no case was either a local or general reaction produced by the injection.

It is hoped, in a future investigation to test the pathogenicity of these bacteria more fully by injecting cultures into the uteri of puerperal animals.

The puerperia of the women examined were afebrile in 93 cases, febrile in five (Nos. 56, 59, 62, 80 and 89). Of the latter, the vaginal secretion of four of the cases was described as "pathological" in

appearance, and contained organisms which must be regarded as "suspect."

Of the 67 cases with "normal" secretion, one only had a febrile puerperium, *i.e.*, 1.5 per cent.

Of the 31 cases with pathological secretion, four had a febrile puerperium *i.e.*, 13 per cent.

The conclusions drawn from the present investigation are as follows:—

1. In the vaginal secretion of the majority of pregnant women b. vaginalis, accompanied in some cases by the yeast fungus, is the only organism present; but, in a minority of cases, in which the secretion is described as "pathological" other organisms are present. The pathogenecity of these organisms is not proved, but they must be regarded as "suspect."

2. In cases in which pregnant women are found to have a pathological-looking vaginal secretion a full bacteriological examination should be made, and if Gram positive cocci are found it is suggested that an autogenous vaccine should be prepared and given during the last weeks of pregnancy, as a prophylactic against puerperal infection.

The cost of the above investigation has been defrayed by a grant from the Thomas Smythe Hughes Memorial Research Fund.

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Recent Work in Anæsthesia for Gynæcology and Obstetrics.

By

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It was thought that a brief resumé of the recent advances in anæsthetic technique might not be without interest to obstetric surgeons and gynæcologists.

We will consider first of all the question of analgesia for the pains of normal labour. Up to a few years ago, a light chloroform narcosis, administered either by a nurse or by the patient herself from a Junker's inhaler, was almost universal. Now, however, a most ingenious and comparatively simple apparatus allows the patient to give herself nitrous oxide as she feels the pains approaching. All possibility of an overdose is avoided, as when the patient's grip relaxes, the gas supply is shut off, while an automatic valve keeps the bag distended at the correct pressure. Not only is the analgesia obtained sooner than with chloroform, but inhalations can be continued indefinitely with no risk of toxicity.

If a continuous anæsthesia is required during the course of the labour, *e.g.*, for the application of the forceps, pure "gas-oxygen" is undoubtedly the ideal method, and does not diminish the force of the uterine contraction.

A Cæsarean section will usually require the addition of a little ether or ethanesal to the inhaled gases during the initial stages of the operation, but by increasing the oxygen percentage just prior to delivery, the baby will be bright red in colour and will cry instantly. The suturing of the uterus and of the abdominal wall can generally be performed under gas-oxygen alone, as the muscles have been well stretched during pregnancy and absolute relaxation is unnecessary.

The same method of anæsthesia also suffices for most minor operations performed *per vaginam*, such as the induction of labour, dilatation and curetting, and is much superior to the administration of chloroform or ether, since the patient will have a pleasant induction under "gas," and will not suffer from the distressing

nausea and smell of ether when she wakes up. A highly-strung, nervous patient should be given a preliminary injection of morphia and scopolamine (*e.g.*, Burroughs and Wellcome's "Hyoscine Compound A") which will make the inhalation of gas-oxygen-ethanesal but a dreamy sequence to an already drowsy condition.

We now come to the consideration of the most exacting type of operations in the scope of this paper, viz., major pelvic surgery. A procedure such as a panhysterectomy demands an anæsthetic technique which minimizes shock and also affords absolute relaxation of the abdominal muscles with the least possible respiratory movement. The time-honoured routines of "gas-ether-chloroform" and "open ether" may, or may not fulfil these conditions. The main difficulties with which the anæsthetist has to contend are:—

(1) The Trendelenburg position, which tends towards congestion and cyanosis.

(2) The weight of the intestines and other upper abdominal viscera, which are usually packed off with towels, and embarrass respiration by pressing against the diaphragm.

(3) Laryngeal spasm, caused reflexly by peritoneal traction.

These troubles are overcome more or less successfully according to the skill of the anæsthetist and the gentleness of the surgeon, but owing to the obvious deficiencies of a pure inhalation anæsthesia, the anoci-association method of morphine-scopolamine by hypodermic injection, stovaine by intra-thecal injection and gas-oxygen by inhalation has been employed as a routine in many hospitals. This combination undoubtedly affords extreme relaxation, but unfortunately several complications may arise. The oft-quoted dangers of the stovaine travelling too far up the spinal canal, can be disregarded if the "light" solution be used. Similarly, the fall of blood-pressure is minimized by the Trendelenburg position adopted for these operations. Nevertheless, no technique employing spinal analgesia can compare in safety with a purely general anæsthesia. Reliable statistics are difficult to obtain, but erring if anything on the optimistic side, the immediate and remote mortality due to the method appears to be about 1 in 400, and is made up of

(*a*) Cardiac failure presumably due to the toxic action of the drug.
(*b*) Subsequent paralysis of the gut.
(*c*) Subsequent interference of reflexes causing urinary infection.
(*d*) Pulmonary complications.
(*e*) Reactionary hæmorrhages in cases in which the initial fall of blood-pressure has been great, and small vessels have not bled at the time of operation.

The recent elaborations of the endo-tracheal method of anæsthesia have, however, provided a technique which seems to be superior to any other for major pelvic surgery. The combination advocated by the writers is endo-tracheal gas-oxygen-ethanesal-chloroform. It is impossible in the scope of this paper to go into details, but it can be stated shortly that the patient is first anæsthetized fairly deeply by some inhalation method, and a tracheal catheter is then passed by direct laryngoscopy. This proceeding is usually followed by some coughing, and gas-oxygen-chloroform is given down the catheter until the patient is breathing quietly, when the chloroform is turned off and ethanesal substituted. The overwhelming advantage of this administration over any inhalation method is, that since a perfectly clear airway is at all times assured, respiration is extremely shallow (and can be stopped indefinitely with safety if desirable), and the colour can always be kept pink. To the gynæcological surgeon, this means that he *knows* that he will have an absolutely relaxed abdominal wall, that the intestines will not obtrude themselves into his domain, and that, however extreme be the tilt of the table, no congestion will occur. The after-effects are gratifyingly few, pulmonary complications being less than after either spinal analgesia or ether administrations, and approximating to those occurring after the gas-ether-chloroform sequence. It is necessary, of course, that a really efficient apparatus should be employed, and that the anæsthetist be an expert laryngoscopist who is thoroughly acquainted with the many special features of endo-tracheal anæsthesia. If these conditions are fulfilled, it is difficult to imagine a more perfect narcosis for major pelvic surgery.

Encephalitis Lethargica occurring in Pregnancy, with an account of Two Cases Complicated by Albuminuria.*

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Introduction.

Encephalitis lethargica is a recently-recognized and important complication of pregnancy, but an examination of the literature reveals no case in which albuminuria and symptoms associated therewith were also present.

Walshe [1] has described four clinical varieties of encephalitis lethargica, dependent on the mode of onset, and of these the commonest is characterized by convulsions, twitching and rigidity—a syndrome somewhat similar to that observed in one of the cases to be described.

Banister [2] has recorded a case of encephalitis lethargica in a primigravida, 26 weeks pregnant. In this, induction of labour was performed, but there was only temporary improvement of about two days' duration.

Margaret Schulze [3] found an increased mortality-rate for all cases of the disease occurring in pregnancy, and states that actual delivery is easier than normal. She lays stress on the fact that retention of urine is liable to occur after delivery.

In several of the cases reported the infant at birth has shown symptoms similar to those of the mother, but of a much diminished severity.

Meyer, Bisch and Stern [4] believe that encephalitis lethargica predisposes to toxæmia of pregnancy, for they found that in progressive cases hepatic activity is diminished. This was demonstrated by the presence of a considerable quantity of urobilin in the urine, and by the fact that after ingestion of lævulose, this substance appears in the urine more readily than in a healthy person.

* Read before the North of England Obstetrical and Gynæcological Society, 1923.

The following cases, which were under the care of Professor Blair Bell in the Liverpool Maternity Hospital, are of considerable interest in that symptoms related to renal disturbance were present.

Case 1. Mrs. F.J., primigravida, æt. 24.

History before admission. There was no history of previous illness, and nothing to suggest old-standing renal disease.

The pregnancy was apparently normal until the 36th week, when medical advice was sought on account of headache and slight œdema of the ankles. Appropriate treatment was given, and there was improvement for a few days, the trace of albumin which had been present in the urine having disappeared on the seventh day from onset of the first symptom. On the following day the patient complained of severe frontal headache commencing early in the morning. The bowels were well moved, and 15 ounces of urine were passed. Early in the afternoon of the same day her friends noticed that the patient was becoming mentally confused, and at 2 p.m. she had what they described as a 'fit'. She was removed to Hospital two hours later as a case of eclampsia.

Condition on admission. Appearance: the patient was fully conscious, but restless; her colour was good, and there was no œdema.

Vision was normal, so far as could be ascertained.

The blood pressure was not raised, being equal to 130 mm. of mercury.

On abdominal examination, the uterus was found to correspond in size with that associated with normal gestation of 36 weeks' duration. The vertex was presenting, and the fœtal heart was distinctly audible over an area consistent with the left occipito anterior position.

On vaginal examination, it was noted that the cervix admitted two fingers, and that the bag of membranes was palpable.

After the passage of a catheter 8 ounces of urine were withdrawn. This was not highly coloured, had specific gravity of 1029, and on boiling deposited a thick cloud of albumin—estimated by Esbach's method to be 3 grm. per litre in amount.

Progress of the disease. Within six hours of admission the patient had six fits of varying intensity, but all similar in character. The first fit occurred immediately after admission and was attended by loss of consciousness, but there was no cyanosis; consciousness was regained within five minutes. Ten minutes later, without warning, there was a much more severe fit, the duration being from three to four minutes. There was marked cyanosis, followed by deep coma which was maintained for five hours; during this time there were four more fits.

The fits appeared to be similar to those of eclampsia. There was no premonitory sign except slight twitching of the face for a few seconds. Then, during about 30 seconds, there occurred spasmodic contractions of various groups of muscles, first of the face and jaw, and afterwards of the trunk and extremities. These in turn gave place to a stage lasting two minutes in which were observed clonic contractions affecting mainly the muscles of the face and jaw, but also to a less extent those of the extremities.

During the night consciousness was gradually regained, but the woman remained restless and twitching. Labour was found to be in progress, and at 6.30 a.m. of the next day a living male child, weighing 6 pounds 11 ounces, was delivered. Parturition was unassisted, and the patient had a very easy labour, although a final fit of very short duration took place as the head was being born.

The placenta came away naturally in 20 minutes, and there was no post-partum hæmorrhage. No excessive infarction and no retroplacental clot were noted.

During the first five days after delivery the general condition of the patient remained unchanged except for some remission in the restlessness on the first day, and very marked diuresis—probably due to the treatment to be discussed directly.

Rhythmic contractions of the muscles of the lower jaw, which were noticed on the second day after delivery, were constantly present from that time onwards, even during sleep.

The temperature remained normal until twelve hours after delivery, when it rose to 102°F., and for the next five days varied between 99.6° and 102°F.

Albuminuria was always present, but the amount diminished to 1 grm. per litre on the fifth day, while the blood urea was never raised above 3 mgm. per litre at any time. All reflexes appeared normal, and no abnormal reflex was present. The lochia were normal, and the uterus involuted well.

At the end of five days the patient, whose condition was becoming worse, and whose mental condition made her difficult to manage, was transferred to a City Hospital.

At the time of transfer, in addition to the signs and symptoms already mentioned, nystagmus—slightly marked in all directions—and ptosis of the left eyelid were observed. The treatment consisted of colon lavage with 20 pints of saline on admission. Six hours after admission blood transfusion, by means of Professor Blair Bell's special apparatus, was practised, and 700 cc. of citrated blood were administered intravenously. Two injections of morphia (gr. $\frac{1}{6}$), with an interval of eight hours between them, were given on the first day.

At the City Hospital to which she was sent, her condition was

considered to be typical of the myoclonic form of encephalitis lethargica. She died on the 20th day after delivery.

Post-mortem examination. At the post-mortem examination the diagnosis was confirmed. In view of the history careful search was made for lesions of toxæmic origin, but none was found.

Case 2. Mrs. A.C., primigravida, æt. 28.

History previous to admission. There was a history of good health until the 35th week of pregnancy. The patient then began to suffer from insomnia and neuralgic pains in the head, which were attributed to a fright. There was nothing to suggest any toxæmic state.

Condition on admission. Her condition on admission to the Liverpool Maternity Hospital was as follows: there was excitement and restlessness, but she was quite rational, and her temperature and pulse were normal. Incoördinated clonic movements were present, affecting the muscles of the head, face and limbs. These movements were continuous, even during sleep.

All the reflexes appeared normal, and there was no abnormal eye symptom.

The uterus corresponded in size with that associated with normal gestation of 37 weeks' duration, the vertex was presenting, and the fœtal heart was audible.

On catheterization 20 ounces of urine were withdrawn, and in this albumin was found to be present to the extent of 2 grm per litre.

The thyroid gland was not enlarged. The patient was very constipated.

A provisional diagnosis of chorea gravidarum was made, so treatment with parathyroid extract, calcium lactate, and sedatives was adopted. Of the sedatives, morphia, chloral and bromides were all tried, but they had little effect in arresting the movements. Subsequently the case was diagnosed as one of encephalitis lethargica.

Progress of the disease. During the days following admission delusions developed, and the movements became gradually worse. On the fourth day the patient gave birth to a still-born, non-macerated female child, weighing 5 pounds 13 ounces, after an easy and uncomplicated parturition. While in labour, and for a few hours after delivery, the patient was unconscious, and the temperature, previously normal, rose to 100° F., and thereafter remained between 100° F. and 102° F.

On the day after delivery considerable improvement in the general condition was noted, but diplopia had developed. The patient's state gradually became worse during the next four days: she was semi-conscious, continually twitching and restless, and

delusions developed, so she was transferred to a City Hospital. The diagnosis—encephalitis lethargica—was subsequently confirmed.

From that time the patient's condition steadily improved, but complete recovery, so far as the nervous system is concerned, has not taken place, and is not anticipated.

Post-mortem examination of the child revealed nothing of significance.

Conclusions.

(1) The presence of albuminuria and, therefore, presumably of some degree of toxæmia, would seem to influence the mode of onset, the early symptoms, and the severity of cases of encephalitis lethargica occurring in pregnancy.

(2) The diagnosis may be difficult owing to the simulation by this disease of the symptoms of eclampsia and chorea gravidarum.

(3) There appears to be a definite remission in the progress of the disease for a variable period of several days after delivery.

In conclusion, I wish to express my indebtedness to Professor Blair Bell for permission to report these cases.

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CLINICAL REPORTS.

A Case of Salpingo-cæcal Fistula with Partial Prolapse of the Fallopian Tube into the Cæcum.

By MILES H. PHILLIPS, M.B., B.S. (Lond.), F.R.C.S. (Eng.),
Professor of Obstetrics, the University of Sheffield;
Senior Surgeon, Jessop Hospital for Women, Sheffield.

FISTULOUS openings between suppurating Fallopian tubes and the large bowel, especially the pelvic colon, are well known, and Bland-Sutton has described an instance of communication between the vermiform appendix and a pyosalpinx.

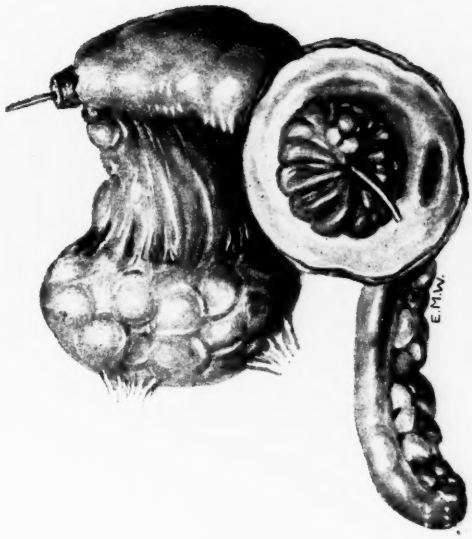
The unexpected result of inflammatory adherence between a Fallopian tube and the cæcum, to be described under the above title, does not appear to have been previously reported.

The patient, who had given birth to three children, was 32 years of age. Her last child was born in 1920, the puerperium being complicated by an attack of severe abdominal pain lasting two weeks, and followed by a persistent yellow discharge.

She was admitted into the Jessop Hospital in November, 1922, apparently suffering from a subacute attack of bilateral salpingo-ovaritis, the uterus being retroverted and fixed. Refusing to stay in hospital, she went home to be treated by her own doctor. Five weeks later the patient attended the Out-patient Department, and was found to have a fixed tender swelling to the right of the uterus. On her out-patient card there is a note which says "this probably contains pus." Four weeks afterwards she was feeling much better and free from pain, and the right adnexal swelling had disappeared.

In August, 1923, the patient was readmitted for constant back-ache and intense pain at the periods, which were regular but scanty. The retroverted uterus was still adherent, but there was only slight enlargement of the appendages.

After opening the abdomen, the pelvic colon, which was adherent to the retroverted uterus, was freed. The left appendages appeared to be nearly normal. The right ovary was adherent to a loop of the sigmoid colon, while the thickened right Fallopian tube was firmly fixed to the cæcum which hung over the brim of the pelvis.



Salpingo-cæcal Fistula.

The adherent Fallopian tube was cut free, half-an-ounce of thin, brownish fluid escaping from the slightly distended tube. The right Fallopian tube and ovary were then excised and the uterus slung to the abdominal wall by means of the left round ligament.

It was then noticed that the caput of the cæcum was thickened. Thinking this might be due to a new growth or to a tuberculous ulcer, I cut the thickened area out, together with a normal vermiform appendix. The bowel wound having been sutured in layers, the abdominal incision was closed.

On inspecting the piece of excised cæcum, a papillary excrescence was found sprouting from an area about half-an-inch in diameter, well away from the orifice of the vermiform appendix. The rest of the cæcal mucous membrane was of healthy appearance. A probe passed easily into a depression in the middle of the papillary projection and came out on the raw surface on the outside of the cæcum from which the Fallopian tube had been freed. The appearances strongly suggested that the papillary excrescence was in reality the fimbriated end of the Fallopian tube which had prolapsed into the cæcum.

Microscopical examination proved this opinion to be correct. The prolapsed fimbriæ of the Fallopian tube were seen to be swollen by engorgement of blood-vessels, œdema, and clusters of lymphocytes. The covering epithelium was for the most part normal in outline, though generally not taking the stain deeply. A few pseudo-glandular spaces had resulted from adhesions after epithelial desquamation. At one place the fimbrial epithelium is seen merging into the endothelium of a peritoneal fold.

The suggestion is made that a peri-tubal pyocele had ruptured into the cæcum, and that after the pus had escaped into the gut the fimbriated end of the Fallopian tube had prolapsed into the bowel.

The rest of the cæcal mucous membrane was normal. The wall of the Fallopian tube was slightly thickened; its cavity had collapsed after escape of the fluid contents.

Microscopical examination of the Fallopian tube and ovary showed only slight evidence of previous inflammation.

Six months later the patient reported that she was entirely free from pain.

Fœtus Peromelus.*

By W. Blair Bell, M.D., B.S. (Lond.),

Professor of Obstetrics and Gynæcology, University of Liverpool; Gynæcological and Obstetric Surgeon, Royal Infirmary, Liverpool.

(From the Department of Obstetrics and Gynæcology, the University of Liverpool.)

The specimen illustrated in Fig. 1, which was sent to the Department by a midwife, is of some interest.

It was impossible to obtain a detailed history of the parents. The father is a sailor, and the mother, who previously had passed through four normal pregnancies and confinements, informed the midwife that she had not menstruated since her last child was born on October 17, 1921.

The fœtus, which had undergone considerable maceration, was expelled stillborn, together with the placenta, when the mother believed herself to have been pregnant for eight months.

The following figures concerning the fœtus and placenta are of some moment :—

Weight of the fœtus ...	...	870 grms. (1 lb. 14 oz.)
Weight of the placenta	...	360 „ ($12\frac{1}{2}$ oz.)
Length of the cord ...	...	18 cm. ($7\frac{1}{10}$ in.)

It will be noted that the relation between the weight of the fœtus and the weight of the placenta is about 2 : 1, instead of 6 : 1, and that the umbilical cord is one-third of the average normal length.

A radiograph shows that the skeleton of the fœtus is normal except for the distal portions of the arms and legs—that is, below the elbow and knee-joints respectively—which are partly absent (Fig. 2)

Instances of peromelus (πηρός = maimed; μέλος = limb)—often called 'hemimelus' to indicate the formation or absence of half the limb—are comparatively rare. Sometimes only one limb is affected, occasionally two or more are deformed. The nature of the condition has given rise to considerable discussion. Some hold that

* Read before the North of England Obstetrical and Gynæcological Society, March 14th, 1924.

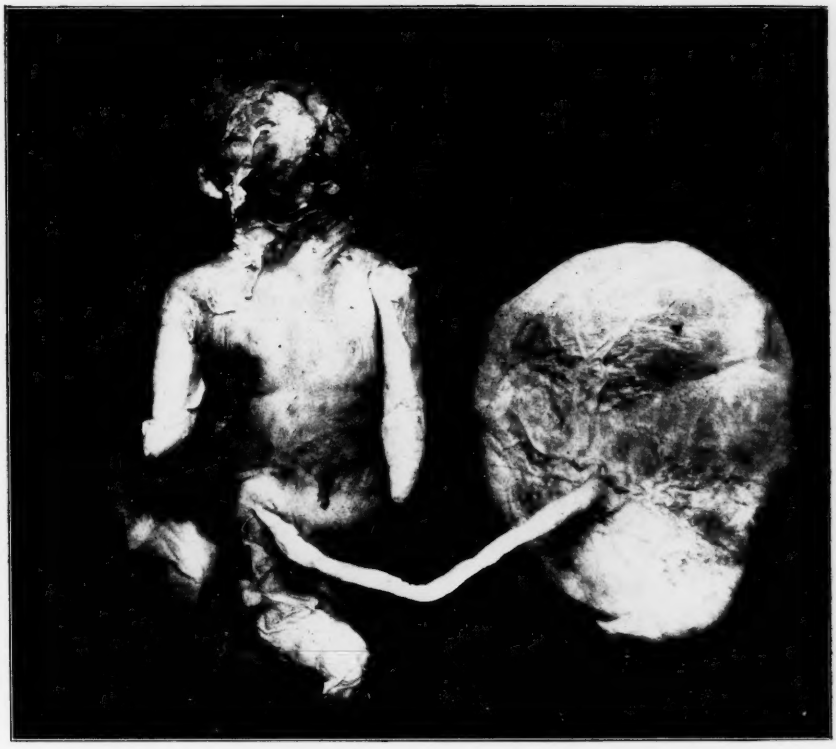


Fig. 1. Specimen of Fœtus peromelus attached to the placenta by a short umbilical cord.

Fig. 2. Radiograph of Fœtus peromelus.

in all cases of this character the mutilation is the result of intrauterine amputation by the cord or amniotic bands; others believe that the deformity may also be due to developmental error, to disease in the embryo or membranes, or to ectochorionic fœtal development.

It is certain that in many cases intrauterine amputation is the result of constriction by coils of the umbilical cord around the limb in question—usually in these circumstances only one extremity is involved—for cases have been recorded in which partial amputation has been produced in this way. In others, complete or partial amputation has been performed by amniotic bands. The portion of the limb that has been severed has sometimes been recovered from the maternal passages, or has been expelled during parturition.

It is unnecessary for me to cite the literature of intrauterine amputation, as this is comprehensively considered prior to the last twenty years by Ballantyne,[1] and subsequent communications do not appear to have thrown fresh light on the subject.

In another group of cases no evidence of actual amputation can be discovered, and to this group belongs the case now presented.

It is obvious that in this specimen the cord is too short for it to have become coiled around a limb, and no amniotic band or adhesion is to be observed. It is, moreover, extremely improbable that intrauterine amputation of *four* limbs by bands or coils of the cord would occur.

We are, therefore, compelled to believe that in some cases the condition is due to developmental derangement. What the mechanism of such a disturbance is we have no idea. It is, indeed, most difficult to understand how such a state of development as that seen in the left forearm of the present specimen could have come about: the generation of half of the shafts of long bones—not the dwarfing of the whole of the bones—is most difficult to understand.

If the child survives, as sometimes happens, its lot may be a most unfortunate one; and, as the lay mind is only too ready to ascribe fœtal anomalies, especially deformities of the limbs, to maternal mental impressions, it is a matter of great importance for us to endeavour to obtain definite knowledge as soon as possible. In the presence of amputations by amniotic bands or coils of the umbilical cord it is an easy matter to dispel the idea that the mutilation is the result of a mental impression; but in some examples of peromelus, such as that I have just described, we have at present no satisfactory explanation to offer.

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Prolonged Retention of Hydatidiform Moles in the Uterus, with Description of a Case in which the Mole was Retained for Ten Months.*

By W. Blair Bell, M.D., B.S. (Lond.),

Professor of Obstetrics and Gynæcology, University of Liverpool; Gynæcological and Obstetric Surgeon, Royal Infirmary, Liverpool.

(From the Department of Obstetrics and Gynæcology, the University of Liverpool.)

Cases of prolonged retention of a hydatidiform mole in the uterus are occasionally reported, and an example of this, very similar to my own, is described by my colleague, Mr. St. George Wilson, in the present issue of the Journal (p. 278).

Formerly, it was believed that in all cases of hydatidiform degeneration of the chorion the uterus is larger in size than normal to the estimated period of pregnancy, and that irregular small hæmorrhages and a blood-stained discharge from the uterus are constant concomitants of this condition. It appears, however, that the activity of the chorion epithelium and the liquefactive degeneration of the stroma may be arrested at an early period by 'hæmorrhages' in the choriodecidual spaces. In this event a mole, which has the characteristics of a so-called 'blood mole', together with those of an hydatidiform or vesicular mole, may be produced.

In such circumstances the symptoms and physical signs resemble those of a 'missed abortion' or 'blood mole', rather than the classical signs and symptoms of an actively-growing vesicular mole.

Description of Case.

Mrs. N.H., æt. 34, was admitted to the Royal Infirmary on February 8, 1924. Her previous history was unimportant. She had had two children, the second being born on February 12, 1922. Menstruation had always been regular, except during pregnancy and the puerperium. The patient stated that the last menstrual period had appeared on March 20, 1923 and ended on March 23.

* Read before the North of England Obstetrical and Gynæcological Society, March 14th, 1924.

Photograph of hydatidiform mole which had been retained in the uterus for 10 months. A very large vesicle is to be seen on the right, and the amniotic cavity laid open on the left.

Section of portion of the mole illustrated in showing typical hydatidiform degeneration of

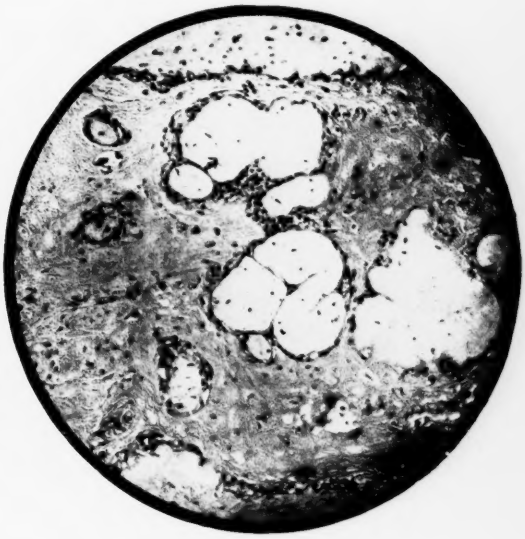


Fig. 3. Section of portion of the mole illustrated in figure 1, showing villi embedded in blood clot.

Since then amenorrhœa had been complete, except for a slight ' show ' on one day at the beginning of August 1923.

On examination, the uterus was found to be enlarged to the same size as that of the pregnant organ at the 12th week of gestation. The body of the uterus was boggy in consistence, and the cervix soft.

On February 13, anterior hysterotomy was performed and the mole was readily removed. It appeared to be attached to the wall of the uterus by light adhesions only; these were easily separated with a finger passed between the mole and the uterine wall. Recovery was uneventful, and involution of the uterus was complete at the end of the second week after operation.

Description of Specimen.

The mole after removal was found to measure $8.5 \times 6.5 \times 2$ cm., and to weigh 65 grammes (Fig. 1).

Macroscopical examination. The specimen appears to be a mass of compressed vesicles mixed with blood-clot. The vesicles are irregular in size, and a very large one is to be seen on the surface of the mole. There is a small amniotic cavity, but it does not contain an embryo.

Histological examination. The sections show that most of the villi have undergone the degeneration common to hydatidiform moles; they are swollen, and the epithelium on the surface is irregularly hyperplastic; but the villi, although living, show little evidence of activity (Fig. 2). There is, also, a considerable quantity of old blood-clot in which many villi are embedded, and these show to a much less degree, if at all, the appearance of vesicular degeneration. They are less well-preserved and the epithelium is more uniform; indeed, the whole picture in these parts of the specimen is to a great extent characteristic of that seen in blood moles (Fig. 3).

Conclusion.

A mole in which hydatidiform degeneration of the villi is present may be retained in the uterus for many months after it has ceased to develop owing to ' hæmorrhages ' in the choriodecidual space. These ' hæmorrhages ' produce in connexion with the hydatidiform mole a condition similar to that seen in the ordinary blood mole.

Hydatidiform Mole Associated with Amenorrhœa for Nine Months.

By J. St. George Wilson, *M.C.*, M.B., Ch.M. (Liverpool), F.R.C.S. (Eng.),

Hon. Surgeon, Samaritan Hospital, Liverpool.

(From the Department of Obstetrics and Gynæcology, the University of Liverpool.)

The patient is a multipara, having had three normal pregnancies and confinements. The last child was delivered on July 6, 1921, and lactation was continued until May 1922—that is, for a period of ten months. The patient had menstruated regularly, every four weeks for four days, until the last period which began on the 16th March, 1922. Morning sickness started towards the end of May and continued until July 1922.

In August the patient made a trip to the Isle of Man, and the boat ran aground in a storm. From this time until December, when she expected her confinement, she enjoyed excellent health.

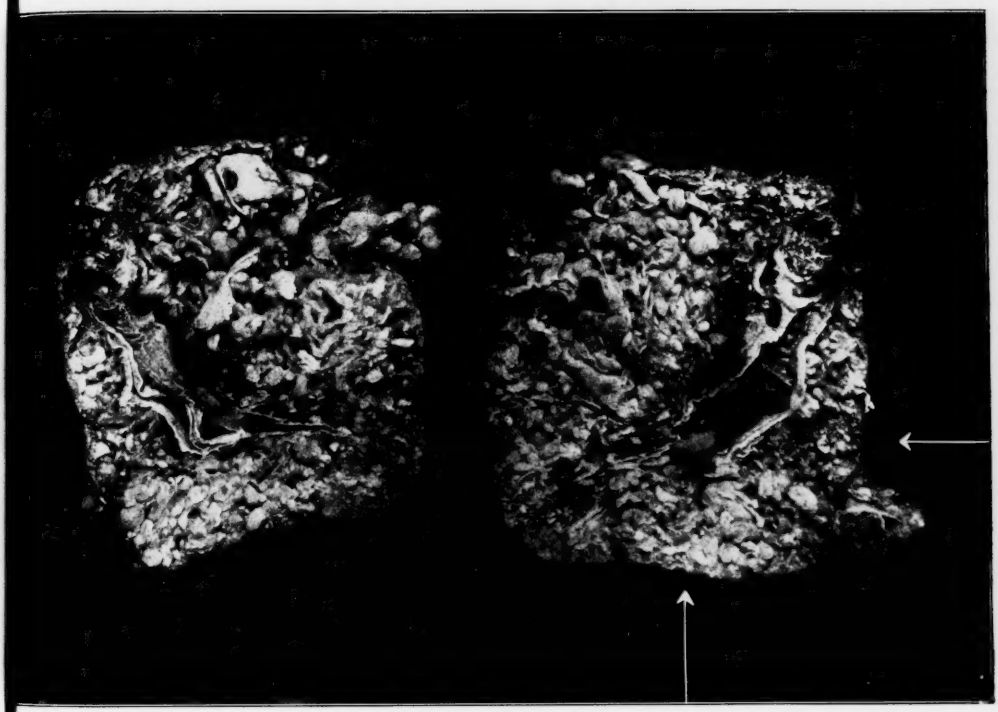
In the following January there was a 'show' for two days, and the patient came to my ante-natal clinic on January 30, 1923.

On examination, the uterus was found to correspond in size with that of 16 weeks' gestation; it was cystic in consistence, and was felt to contract and relax during examination. The cervix was moderately soft, and there was definite pulsation in the left vaginal fornix. On auscultation no fœtal heart-sound could be heard, but the uterine souffle was distinct. There were no distinctive changes in the breasts and vagina.

The height of the fundus was carefully marked on the abdominal wall, and, on February 23, 1923, another examination revealed neither increase in the height nor further enlargement of the body of the uterus.

A "missed abortion" was suspected, and induction was advised. For that purpose the patient was admitted to hospital on February 24, 1923.

After admission, intramuscular injections of 1 ccm. infundibular extracts were given six-hourly. The patient then stated that she felt fœtal movements for the first time—a sensation which I believe to have been due to increased intestinal peristalsis. On February 26, 1923, three bougies were passed into the uterus without anæsthesia,



Photograph of hydatidiform mole bisected and showing amniotic cavity containing a small embryo, indicated by arrows

and the injections of infundibular extract still continued. The bougies were removed after 48 hours on February 28, 1923, without having produced any apparent result.

On the morning of March 1, 1923, the temperature rose to 104°F. At 2 a.m. on March 2, 1923, the uterus expelled the mole intact with one or two 'pains' and no abnormal hæmorrhage. At 3.30 a.m. the patient had a rigor. At 10 a.m. the temperature fell to normal, and remained so.

There was an offensive sanguineous discharge from the vagina which ceased in a day or two. On March 12, 1923, when the patient left hospital, the uterus was normal in size, position and mobility, and the appendages were impalpable.

Description of the specimen. The mole, which is a pyramidal mass of vesicles, 12 cms. long and 8 cms. wide at the base, is intact, and is almost entirely covered with decidua. The vesicles vary in size, and on histological examination show the typical features associated with hydatidiform degeneration of chorionic villi.

On bi-section of the specimen an amniotic cavity was disclosed in the interior of the mole, containing a fœtus 12 mms. in length attached to the wall of the cavity by the umbilical cord on which was a small cyst (see figure).

A Cervical Dilator for use during Cæsarean Section.

By Daniel Dougal, *M.C.*, M.D. (Manchester),

Assistant Lecturer in Obstetrics and Gynæcology, University of Manchester; Gynæcological Surgeon, Manchester Northern Hospital; and Honorary Assistant Surgeon for Women, St. Mary's Hospitals, Manchester.

So long as Cæsarean section is performed before the onset of labour there will always be a number of cases, especially in primigravidæ, in which the cervical canal is closed and prevents the escape of blood from the uterine cavity. This is apt to be an unpleasant complication as the retained blood interferes with the proper retraction of the uterus, sets up severe after-pains and frequently produces a considerable degree of shock.

The obvious remedy is to dilatate the cervical canal, either during or immediately after the operation. To dilate the canal after the operation takes a good deal of time, as the position of the patient has to be altered, the vulva and vagina cleaned up and special vaginal instruments used. There is also some risk of conveying infection into the uterus.

Dilatation from within the uterine cavity has been carried out with graduated dilators, each dilator being pushed through into the vagina and then withdrawn again into the uterus. This is obviously a dangerous procedure, unless very special care has been taken to sterilize the vagina beforehand. Another method is to pass a dilator of moderate size right into the vagina from above, and remove it *per vulvam* after the abdominal operation is completed. This is a much better plan, but if a solid instrument be used it may defeat its object by blocking the cervical canal, and even if it passes right through into the vagina, the cervix may close again behind it and still prevent the escape of blood.

To obviate these difficulties I have had a gutter-shaped dilator made, and this instrument, when passed through the cervix from the uterine cavity, forms a channel along which the blood can flow quite easily. The dilator is of moderate size, being $7\frac{1}{2}$ inches long by $\frac{5}{8}$ inch in diameter, and well tapered at the end so that it can be introduced easily into the undilated cervix.

A Doyen or bladder retractor is placed in the lower end of the uterine incision, and the position of the internal os located by sight or by feel. The dilator is then inserted and passes into the canal

with a distinct jerk. It is then pushed well down, the upper end remaining in the lower uterine segment.

At the close of the operation the vulva is exposed, and the tip of the dilator can generally be seen projecting about three-quarters of an inch from the vaginal orifice. It is then a simple matter to remove it with the fingers or by means of a hook passed into the groove.

In some cases the instrument is not visible, having caught on the perineum, but it will be found within easy reach and can be extracted without difficulty.

I have used the dilator in a number of primigravidæ in whom the cervix was undilated and found it quite easy to insert and efficient in its action.

The instrument has been made for me by Messrs. Mayer and Phelps, of London, and I am indebted to them for the care with which they have carried out my instructions.

Three Unusual Cases.

By G. W. THEOBALD, B.A., M.B., B.Ch. (Cantab.),
Assistant Master, Rotunda Hospital, Dublin.

I AM indebted to the Master, Dr. Gibbon FitzGibbon, for permission to report the three following cases of more than ordinary interest :

M.S., æt. 35, was admitted to the Rotunda Hospital on the 2nd of November, 1923, complaining of headache and vomiting. She had last menstruated on the 1st of May, and had therefore had a period of 26 weeks amenorrhœa. This was her ninth pregnancy—six full-time normal labours and two abortions. She stated that she had suffered from headaches throughout the pregnancy.

Patient was a pale, sallow woman, and looked ill. Her cheeks were covered with venules (" beer drinker's cheeks ").

Pulse. Rate 126, regular and of good volume. The rate varied markedly with respirations.

Heart. The apex beat was 12½ cms. from the mid-line in the fifth interspace. There was no enlargement to the right of the sternum and no thrill. The first sound at the apex was very accentuated, almost reduplicated. Both pulmonary sounds were feeble, the second sound being accentuated. Both aortic sounds were feeble. The heart condition suggested some degree of myocarditis.

Lungs. Nothing abnormal discovered.

Abdomen. The uterus reached almost to the level of the umbilicus. No fœtal parts were felt and no fœtal heart sounds were heard. There was very marked œdema of the abdominal walls and legs, but none of the thighs, face or vulva. There was no history of rheumatism or scarlet fever. The urine was loaded with albumen and became almost solid on boiling.

Treatment. The patient was put to bed and given a high enema. She was encouraged to drink as much water as possible, and was freely purged. All food was withheld. In the six days of treatment she took 1,360 ounces of water and 31 ounces of the hospital Mist. Sennæ Co., which is the same as that of the British Pharmacopœia, except that it contains an extra drachm of magnesium sulphate in every ounce. During the six days she passed 178 ounces of urine and

553 ounces of fluid motions. It is interesting to note that on the day following induction of labour she passed 123 ounces of urine, *i.e.* two-thirds of the amount she had passed in the previous six days.

November 9. The fundus of the uterus had definitely risen in the last two days, and is now two inches above the level of the umbilicus, and the uterus feels more cystic than before. The urine is still loaded with albumen, but the patient appears less toxic. The diagnosis of a hydatid mole in association with pregnancy was made.

After the administration of ether the internal os was found to admit one finger with ease, and a small fœtus was felt floating about. The placenta was situated on the lower segment, and above it was a cystic swelling which was thought to be the sac of a second fœtus. A stomach tube was inserted between the chorion and the wall of the uterus. There was practically no bleeding.

Nov. 10. At 6.10 a.m., eight hours after the insertion of the tube, a macerated fœtus of about 18 weeks was delivered. The placenta was very large and friable, and was the seat of innumerable large and small cysts.

Pathological report by Professor O'Sullivan, Trinity College, Dublin. The chorionic villi vary in their appearances in different parts. In some places they have the normal appearance seen in a seven months' placenta. They are fibrous, with thick-walled vessels, and the Langhans' layer has disappeared. In other places they are much swollen and œdematous, showing very little tissue, and have the appearance of the villi of an hydatid mole.

The patient made an uninterrupted recovery without morbidity (*B.M.A.* standard). The patient was put on an arsenic tonic after delivery. Her urine did not clear completely from albumen before she left the hospital. She never bled at any time, nor did she have any eye symptoms.

The pathology of this condition is generally supposed to be due to changes in the chorionic villi, as first described by Marchand. These changes usually take place before the end of the second month, when the ovum is destroyed. Stoeckel and others describe cases in which part of the placenta, both macroscopically and microscopically, shows conversion into a mole. Not so long ago there was in this hospital a case of hydatid mole in association with a normal pregnancy. The interest in the present case lies in the fact that the fœtus had apparently undergone normal development for eighteen weeks, whereas the whole placenta had undergone changes to such a degree that at first sight it appeared to be a mole and not a placenta.

M.D., æt. 28, 2-para, was admitted to this hospital on Nov. 7, 1923. Many years ago she was delivered of a premature child, and was told that she would die during her next confinement unless she went to hospital. She had apparently been in labour for about 48 hours. On Nov. 6, less than 24 hours before admission, repeated attempts at delivery had been made with the forceps. These attempts had lasted for more than two hours.

On admission, it appeared likely that the patient would die before any attempt at delivery could be made. Patient looked extremely ill, her face was pale and sallow, her lips were grey, her pulse-rate was 130, and her temperature 97° F. The uterus was tense, hard, tender and projected forwards. Distinct crepitation could be elicited over the front of the abdomen.

Ether having been administered, the head of the fœtus was perforated and its brain evacuated with a Rheinstädter's flushing curette. The head was then further reduced in size with Schultze's ovum forceps and delivered with the forceps. After delivery the head was decapitated and an arm brought down, which separated on traction. Cleidotomy was then performed and the other arm was brought down; after that the fœtus was eviscerated and extracted. The pelvis was very contracted. There was an escape of foul-smelling gas from the mutilated fœtus. The third stage of labour was normal, although the uterus remained atonic for a while, but finally contracted. There was no bleeding. The condition of the patient became worse, and she died one hour after delivery. Swabs from the vagina and peritoneal cavity grew pure cultures of Bacillus Welchii.

Post-Mortem. A slight excess of fluid was found on opening the abdomen. The uterus was well contracted. The intestines were somewhat distended. The peritoneum of the lower abdomen was very congested and showed petechial hæmorrhages. The whole extra-peritoneal tissue of the pelvis and lower half of the abdominal wall crepitated just like lung tissue, and when cut gas escaped. There was no rupture of the uterus or vagina. The vagina had already begun to show necrosis. The cervical portion of the uterus was stretched out into a flabby sheet, very dark in colour and showing necrotic changes. The interior of the uterus showed similar changes to a lesser degree. The autopsy was performed immediately after death.

Gas formation occurring post-mortem is not a rare event in puerperal women, or in cases of death following trauma. It must, however, be very rare, and I am not able to find a case recorded, in which death from an acute sepsis, probably of less than 24 hours duration, was caused by the Bacillus Welchii growing in pure culture.

E.G., æt. 40, 7-para, was delivered on Sept. 15, 1923, of a 34 weeks male child, weighing 5 lbs. 14 oz. The infant was apparently normal except for its face, which was covered with a red glazed skin. There were no lashes on the glazed eyelids, neither were there any eyebrows. The child looked so repulsive that it was not thought advisable to show it to its mother. It died on the eighth day.

Dr. R. H. Micks, Assistant Physician to Sir Patrick Dunn's Hospital, kindly sent me the following account of the autopsy:— Widespread hæmorrhage into subcutaneous tissue of scalp and face. Nothing abnormal was found on examination of cranial cavity or spinal canal. Brain and spinal cord appeared normal. Respiratory tract showed nothing abnormal. Lungs showed numerous deeply-congested areas. No increase of lymphoid tissue noted. Thyroid and thymus normal size. Heart showed no abnormality.

On opening the abdomen the most striking appearance was the red and yellow mottling of the liver, which was normal in size. The kidneys were very pale. The spleen was of moderate size and consistence, but definitely congested. All the other viscera looked healthy. There was no hypertrophy of Peyer's patches. The bone marrow of the left femur was examined and was apparently normal.

Histological examination showed extensive fatty degeneration of the heart muscle and liver, together with fat and cloudy swelling in the tubules of the kidney.

The case is very unusual. There was no albumen at any time in the mother's urine, neither was she given any drug or anæsthetic. The course of her puerperium was absolutely normal, her temperature never even rising to 99°F. A Wassermann test gave a negative result. Her eldest child was a girl, eleven years old, and perfectly healthy and well. The next four children were males, and were either born dead or died within 15 days. The sixth child was a girl, and she is alive and well.

The question that arises is, whether the degeneration in the liver was caused by some toxin in the mother's blood not sufficient to do her harm, or against which she was immune, or whether the fault lay in a congenital malformation of the fœtus. If the latter suggestion be correct, then it is interesting to notice that both her girls are healthy and well, and that of her five boys only one lived as long as 15 days. Should there be anything in the theory of the spermatozoa being responsible for sex, then it would appear as if those sperms responsible for the daughters of the patient were normal, while those responsible for the sons were diseased or imperfect.

A Case of Uterus Duplex with Adenomyoma.

By Leslie H. Williams, M.D., M.S. (Lond.), F.R.C.S. (Eng.),
Obstetric Registrar, University College Hospital.

E.N., a widow, aged 47, was admitted to University College Hospital on May 9, 1922, under the care of Sir George Blacker.

In 1895, at the age of 20, the patient sought advice at another hospital, as she had not menstruated. As a young girl she experienced pains commencing in the lower abdomen and radiating down both thighs. These pains were probably menstrual in origin since they came on regularly at intervals of three weeks and lasted for two days.

An examination disclosed that she had no vagina, and she was advised that no operation could be undertaken. At the age of 24 the patient married.

In 1919, the pains having become progressively worse, the patient consulted Sir George Blacker, who advised palliative treatment.

Later in the same year the patient was admitted into University College Hospital, when the fact that she had no vagina was confirmed. She was examined only by the rectum, without an anæsthetic, and no uterus was felt. Palliative treatment was recommended, and she was discharged.

Until her admission in 1922, the patient continued to suffer from periodic pains, which steadily became more severe and of longer duration. In recent years the pains, which always started on the right side and radiated down the thighs, to the right groin and across the back, had become so severe as to necessitate the use of morphia.

It was in view of the increasing pain and of the severity of recent attacks that the patient was re-admitted in 1922. An exploratory laparotomy was performed by Sir George Blacker, who removed both uteri and their appendages by total hysterectomy. The band of tissue which joined the uteri and which had formed a distinct ridge transversely across the floor of the pelvis was carefully preserved. There was no trace of a vagina, and no sign of any "ligamentum recto-vesicale."

The parts removed consist of a good example of "uterus duplex" with a normal ovary and Fallopian tube attached to each half-uterus. The two cervices are united by a band of tissue which was found to consist of peritoneum only (Fig. 1).

Fig. 1. Uterus Duplex showing adenomyoma in the larger horn.

Fig. 2. Section showing the endometrium and uterine cavity of the larger horn. Also adenomyomatous tissue in the deeper layers.

Fig. 3. Similar to Fig. 2. Typical adenomyoma in deeper layers.

Fig. 4. Adenomyomatous tissue further away from the uterine cavity. One gland distended with blood.

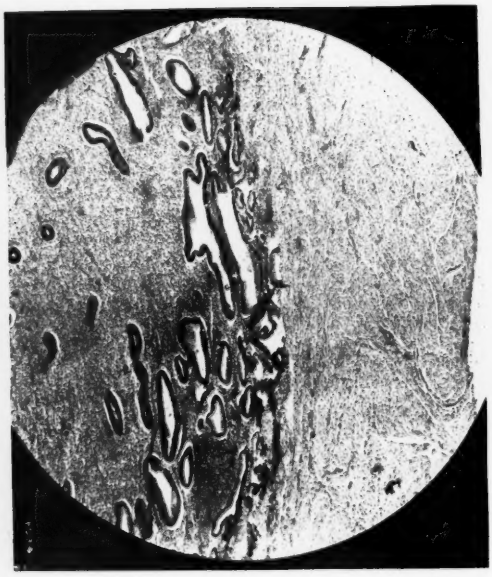


Fig. 5. Normal endometrium of the smaller horn.

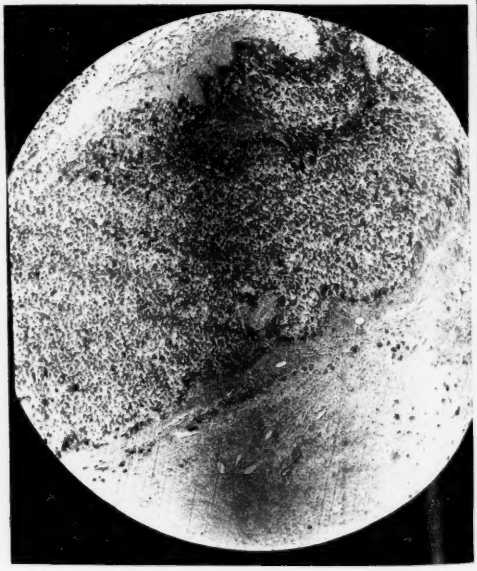


Fig. 6. Part of a corpus luteum from the right ov Wandering fat, containing cells, are seen at some dista from the main mass.

The larger, right, half-uterus measures $2\frac{1}{8}$ in. × $1\frac{1}{2}$ in. × $1\frac{1}{4}$ in., and consists almost entirely of the uterine body, the cervix being a solid cylindrical mass of tissue $\frac{1}{4}$ in. long and $\frac{1}{4}$ in. in diameter.

On section, the "body" shows a cavity rather smaller than a pea, and partly surrounding this is a darker zone which shows the structure of adenomyoma (*vide infra*). This cavity has no communication with the exterior, the cervix being solid and the vagina absent, but it does communicate with the lumen of the Fallopian tube, and it is not distended with blood.

The small rudimentary left half-uterus is almost entirely solid, but a minute cavity, smaller than a pin's head, can be seen. No communication between this cavity and the lumen of the Fallopian tube can be demonstrated.

On microscopic examination, the surface epithelium of the endometrium lining the cavity of the larger half-uterus has unfortunately been destroyed in most places, as can be seen in Figs. 2 and 3. Where it has persisted, it is of the low columnar type, and in places it has a little blood adhering to it. Otherwise there is no evidence of distension with menstrual fluid. The deeper layers are normal both as regards glands and stroma, and this endometrium rests on normal uterine musculature.

Figs. 2 and 3 both show the commencement of the adenomyomatous tissue, and in Fig. 3 particularly both the glands and the cytogenous mantle are well displayed. Another view of the adenomyomatous tissue, this time deeper in the uterine musculature, is shown in Fig. 4, and here one of the gland tubules is seen to be distended with blood, some of which has fallen out during the preparation of the specimen. The endometrium of the rudimentary left half-uterus is seen in Fig. 5, and exhibits no abnormal characteristics.

The ovaries are normal both macroscopically and microscopically. Fig. 6 shows part of a normal corpus luteum, and apparently wandering from this are other cells, which also are stained with Sudan III, and which therefore also show as black dots in the micro-photograph which is taken on an ordinary (not pan-chromatic) plate. These cells appear to be the so-called "interstitial cells."

This case exhibits several points of great interest. In the first place, the patient should have menstruated if it is granted that menstruation depends on the presence of normal ovarian tissue; since there were present normal ovarian tissue-follicles, stroma, corpora lutea and even the so-called interstitial cells. There is also normal uterine endometrium. Moreover, the patient had menstrual symptoms, and it was the severity of the symptoms that led to the operation. Why, then, do we find so little evidence of distension of

the uterine cavity? The entire absence of adhesions around the Fallopian tube does not support the idea that the menstrual fluid escaped by that route.

With regard to the pain; this case rather supports the theory that dysmenorrhœa may be due not only to "uterine colic," but also to the flushing of the uterus with blood at the period, thus causing a painful increase in intrauterine tension, such flushing being purely temporary and having no physical signs. In the second place, what is the cause of the adenomyoma? Von Franqué and others have explained the mucosal invasion in diffuse adenomyoma as being due to chronic inflammation, but in this case such an explanation seems to be out of the question. Is it possible that the periodic increases in the intrauterine tension have resulted not in distension of the uterine cavity but in the production of an adenoma? So far as I am aware such an explanation has not previously been put forward.

With regard to the deformity itself. The case would appear to belong to the second stage of F. von Winckel's scheme of uterine maldevelopments (Über die Einteilung, Entstehung, und Benennung der Bildungshemmungen der weiblichen Sexualorgane, 1899), viz., maldevelopments occurring in the second month of intrauterine life when the Müllerian ducts are hollow and have united in part of their extent into the genital cord.

The patient made a good recovery from the operation, and, on March 14, 1923, wrote to say that she was "most decidedly better for the operation," and that, although she took a long time to recover her strength, she now has no pain and has put on weight. Further, she has suffered from hot flushes, but such menopausal symptoms are only to be expected since both ovaries were removed.

Combined Carcinoma and Tuberculosis of the Uterus.*

By GILBERT I. STRACHAN, M.D. (Glas.), M.R.C.P. (Lond.), F.R.C.S. (Eng.),

First Assistant to the Professor of Obstetrics and Gynæcology, Welsh National School of Medicine; Research Scholar to the British Medical Association.

THE rarity of the association of these two lesions in the uterus induced me to bring the details of the present case before the Section.

So far as I know, this is the ninth case of combined carcinoma and tuberculosis of the uterus to be recorded, and of the eight cases previously recorded seven were reported from Germany and one from France, so that this is the first case of the kind to be reported from a British source.

DESCRIPTION OF THE CASE.

Mrs. E., æt. 40, a patient of Dr. Coyne, of Neath, was a 2-para, the last child being 17 years old; she had not seen any periods for five years, but two weeks before I saw her a slight uterine bleeding, lasting only a few hours, had occurred. The complaint was of pelvic pain of some ten years' duration and of increasing severity. Occasionally some dysuria was present. Ovariotomy had been performed 15 months previously, with no relief of symptoms. For several years she had been "troubled with her chest," and had been twice in Sanatoria as a suspected case of pulmonary tuberculosis. No tubercle bacilli had ever been found in the sputum, although searched for on many occasions. The family history was of no medical importance.

Her general appearance was healthy, and abdominal examination was negative. The cervix was found to be the seat of a hard nodular ulcerative condition which did not extend over the vaginal walls, and which bled only very slightly on manipulation. The uterus was somewhat bulky and fairly freely movable.

In view of the degree of involvement of the cervix, total abdominal hysterectomy was recommended, and this was performed on October 20, 1923. On opening the abdomen the omentum was

* A paper read before the Obstetrical and Gynæcological Section of the Royal Society of Medicine, April 3rd, 1924.

found to be adherent to the pelvic organs in general, and especially to the stump of the left ovary. After separating this, the uterus and a right cystic ovary and thickened Fallopian tube were isolated and removed with some difficulty. There was no sign of the left appendages, which presumably had been removed at the previous laparotomy.

On removal, the uterus was found to be distinctly bulky, and of a soft consistence. The peritoneal surface was rough from adhesions, but no tubercles were to be seen. The cervix was occupied by the thick warty tumour previously mentioned. The surrounding parametrium was thickened and infiltrated, but no enlarged glands were found. The Fallopian tube was thickened, congested and enlarged, and its surface was covered with adhesions. The ovary was enlarged, cirrhosed and cystic, having the appearance of chronic oöphoritis.

After fixing it for a few days, the uterus was bisected tangentially, and the cut surface presented the appearance seen in Fig. 1. The cervix was seen to be occupied by infiltrating hard grey carcinomatous tissue; above this was the isthmus, which was thin, and above this again the uterine cavity was seen to be definitely distended and full of pale yellow caseous material. The body and cervix measured 4 in. (10 cms.) in length; the antero-posterior measurement at the fundus was $1\frac{2}{3}$ in. (4.2 cms.); at the isthmus $\frac{1}{2}$ in. (1.3 cms.); and at the cervix again $1\frac{2}{3}$ in (4.2 cms.). The transverse measurement at the fundus was 2 in. (5.0 cms.), and at the cervix $2\frac{1}{4}$ in. (5.7 cms.). The uterine walls were $\frac{1}{3}$ in. (0.9 cm.) in thickness, and on manipulation a sharp line of demarcation was found between the muscular wall and the contained caseous material.

Section of the Fallopian tube showed the walls thickened and the lumen occupied by degenerate mucosa and much curdy and caseous secretion.

The ovary, on section, showed only a thick capsule with numerous contained cysts of various sizes.

On microscopical examination, sections of the cervix showed typical columns of squamous-celled carcinoma. The main histological point of interest here was the presence of definite signs of cornification and cell-nest formation.

In a section of the uterine body, on the one side the structureless caseous material was seen, on the other the muscular layers of the uterine wall, and in between these two layers a third layer consisting of the remains of the mucosa. This was an open, loose fibro-cellular meshwork thickly infiltrated with lymphocytes, and showing at intervals multinucleated giant cells, singly or in clusters. In some places these giant cells were seen to be surrounded by a layer or

Fig. 1. To show the uterus cut antero-posteriorly. A. shows the cervix infiltrated with hard grey carcinoma. B. is the unaffected isthmus of the uterus, while at C. the corpus is seen to be occupied by caseous material and distended with thinned walls.

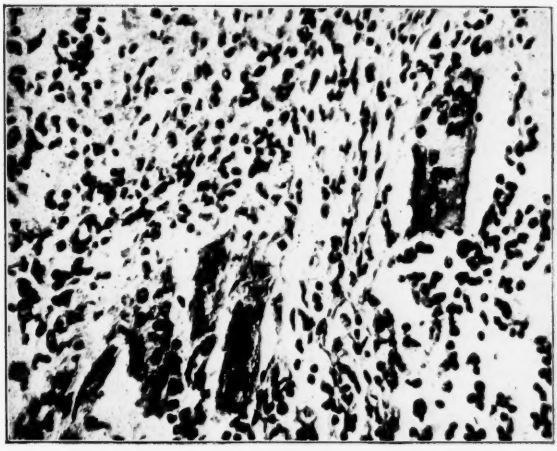


Fig. 2. Photomicrograph of the mucosa in the caseous area showing four giant cells with small-celled infiltration of the surrounding stroma.

two of epithelioid cells, outside which was the lymphocytic zone referred to, but in other places the arrangement was not so regular, the giant cells lying free in the fibro-cellular meshwork surrounded by lymphocytes.

The blood-vessels were generally dilated, but the giant cell systems were not definitely related to the vessels. The lymphocytic infiltration extended to the superficial part of the muscular wall of the uterus, in which situation the muscle fibres were seen to be loosely arranged and in places separated from each other by lymphocytic collections. Tubercle bacilli could not be identified, although searched for in sections specially stained.

The tubal mucosa was swollen and infiltrated with small round cells. The plicæ were enlarged and in many places fused together, and the surface epithelium was almost entirely lost. Such cells as remained were degenerated and stained poorly. Vascular dilatation was present, and the vessel walls were thickened. The muscular layer was œdematous and infiltrated in its inner part with lymphocytes, which, however, were not found in the more peripheral layers. The peritoneal covering was thickened, and showed chronic inflammatory changes.

The ovary showed the changes of chronic oöphoritis and needs no detailed description. In neither the Fallopian tube nor ovary were giant-cell systems to be found, and staining by Ziehl-Neelsen failed to show the presence of tubercle bacilli.

The physical characters described indicate, in my opinion, the association of old-standing tuberculosis of the uterine wall with carcinoma of the cervix, the isthmus being apparently free of either lesion, and it is the rarity of such a combination of lesions that warrants the recording of the specimen.

The following are the main points of previously recorded cases.

Von Franqué's Case.[1] Æt. 43; vaginal hysterectomy for carcinoma of the cervix; 2 cm. above the internal os was a pink nodule the size of a cherry stone, surrounded by normal mucous membrane, with a similar and smaller nodule above it. Microscopically, these were found to be incipient tuberculous foci.

Several myomata were present in the uterine wall at the fundus.

Bass's Case.[2] Æt. 61; post-mortem specimen; necrotic carcinoma of cervix. Uterine mucosa was destroyed and replaced by excrescences of various shapes and sizes projecting into the uterine cavity. On the serous surface many nodules. Microscopically, caseous tuberculosis of the corpus uteri with carcinoma of the cervix. Numerous old tuberculous foci in the lungs.

A subserous myoma, the size of a walnut, was present in the uterine wall.

A. Stein's Case.[3] A *virgo intacta* of 48 years. Total hys-

terectomy was performed for carcinoma of the cervix. An old caseous tubercular deposit was found in the right Fallopian tube, and the uterine cavity formed a sac lined and filled by caseous material. Microscopically, in the uterus and tube many giant-cell systems were present, surrounded by columns of carcinoma which had spread upwards from the cervix as far as the tube. No tubercle bacilli could be found.

Wallart[4] records three cases :—

(*a*) Æt. 55 years; curettage performed, and in the curettings were numerous tubercles, besides an adenocarcinoma. No more details are given.

(*b*) This case is described at great length. Æt. 50 years; chronic pulmonary tuberculosis. Post-mortem specimen. Length of uterus 9.50 cms.; thickness of walls from 1.0 to 3.0 cms. Extensive excavated carcinoma of cervix.

Near the right uterine cornu was a soft walnut-sized nodular tumour. This was a myoma. Elsewhere the uterine mucosa was thick and furrowed.

Both Fallopian tubes were thickened and attached by adhesions to the posterior uterine wall. Their fimbriæ opened into a small abscess cavity in the pouch of Douglas, which communicated by a fistula with the rectum. The ovaries were normal.

Microscopically, tubercles were found in the deeper strata of the tubal mucosa, and in the muscular and subserous coats. No tubercles were found in the region of the peritonitic abscess or in the mucosa of the corpus uteri, and no tubercle bacilli were found in the tubal wall.

In the cervix tubercular formations were present, intermingled with columns of carcinoma cells, and tubercle bacilli were demonstrated here.

(*c*) Æt. 37 years. Post-mortem specimen. Tuberculous meningitis and pulmonary tuberculosis. Adenocarcinoma of the cervix was present. About 1 cm. below the right tubal angle a tubercular nodule, the size of a lentil, was present in the uterine mucosa. No tuberculous signs were present in the carcinoma.

Ahlefelder's Case.[5] Æt. 40 years, sterile. Total hysterectomy for carcinoma of the cervix; myoma, the size of an apple, in the left cornu.

In the corpus uteri the mucosa was thickened and, microscopically, caseated tubercles, in which the tubercle bacilli were demonstrated, were found, together with columns of carcinoma. The ovaries and tubes were chronically inflamed, but not tuberculous or carcinomatous.

d'Hallain and Deval's Case.[6] Æt. 35; seven children and

three abortions. There was a family history of tuberculosis. Clinically, a uterine tumour was found, for which total hysterectomy was performed.

An irregular mamelonated mass riddled with spaces was removed, in which it was impossible to say which part was uterus and which part appendages.

Histologically, the general appearance was of a carcinoma of the corpus uteri, but at one point between the carcinoma columns were found several tuberculous giant-cell foci, in which, however, tubercle bacilli could not be demonstrated.

On reviewing the eight cases recorded, it is found that myomata were present in three, and pulmonary tuberculosis also in three cases, and in one of the latter tubercular meningitis was present. In the case now recorded pulmonary tuberculosis was suspected but not demonstrated.

In three cases, as in the present one, the carcinoma was confined to the cervix and the tubercular lesion to the corpus uteri, while in the other five cases the carcinoma and tuberculosis were intermingled, in four cases in the corpus uteri, and in one case (Wallart's (*b*)) in the cervix.

In only two cases is it recorded that tuberculosis of the Fallopian tube was present, but in several of the others the tubo-ovarian condition is not mentioned.

Also, in only two cases were the tubercle bacilli identified, but it is not stated that they were looked for in every case.

In considering the question of which lesion was primary in these cases, Stein was of opinion that in his case the tuberculosis was primary, as the uterine tubercles (1) were partly fibrous, and (2) gave a negative bacterial result. Wallart considered that in his first case the combination was accidental, and that in the second case the tuberculosis was primary and set up an irritative hyperplasia of the epithelial cells of the cervix, so that they finally acquired the proliferative qualities of carcinoma. But besides this, he considers that a certain predisposition to tumour formation is present in these cases, and quotes, in support of this, the various cases in which uterine myomata were found.

Ahlefelder also considered that in his case the tuberculosis was primary.

In the case now recorded the matter is not easily settled. From the condition of the corpus uteri, filled as it is with the caseous débris of tuberculosis of the mucosa, it may be presumed that the lesion here is of very long duration, and possibly a secondary blood infection from a chronic pulmonary tuberculosis. In the cervix, on the other hand, although some cornification is seen, the

epithelioma cells are actively multiplying, and from the size of the cell columns the condition is far from recent.

Regarding all the features of the case, it is concluded that in the uterus the tuberculosis was the older lesion, but as the tubercular and carcinomatous conditions were separated by an unaffected zone of uterine tissue, it cannot be shown that the tuberculosis had any ætiological effect in stimulating the cervical epithelium to malignant proliferation, and so we must regard the epithelioma as an accidental accompaniment or complication of the previously established tuberculosis of the corpus uteri.

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BOOK REVIEWS.

"Gynæcology with Obstetrics: A Text-Book for Students and Practitioners." By JOHN S. FAIRBAIRN, M.A., B.M. B.Ch. (Oxon.), F.R.C.P. (Lond.), F.R.C.S. Eng.), Obstetric Physician to St Thomas's Hospital, etc., etc. Oxford University Press, 1924. Price, £3 3s. net.

DR. FAIRBAIRN has written a memorable book—memorable for the unconventionality of its style, the independence of its outlook, and the wide extent of ground it essays to cover. The two first-named qualities are doubly welcome, inasmuch as they are rarely exhibited by writers of text-books. The third point is, however, that by which the book will be judged, and by which in due course and after adequate trial, its real usefulness will be appraised.

Any new departure which demonstrates the solidarity of obstetrics and gynæcology is a step in the right direction. The effort of our Scottish colleagues, which preceded Dr. Fairbairn's book by about a year, was probably prompted by this consideration, and the general principle that obstetrics and gynæcology are too closely interlocked to be separately taught is firmly established in this country, although in France and the United States a contrary view is held. It would have given the reader a truer impression of the relative importance which the author attaches to the two divisions if he had entitled his book "Obstetrics with Gynæcology," rather than "Gynæcology with Obstetrics." One gathers that he would like to see the name gynæcology used in the comprehensive sense of including all that comes within the range of both divisions of the subject.

The author in this book has given us of his best, and his best is very good indeed. He has shown an almost encyclopædic knowledge of his subject, and in parts he has so much to say and so little room to say it that his book makes very stiff reading, even for one who is more or less familiar with the subject of which it treats. The average student will at times need all the help he can get from a wet towel and strong coffee when he sits down to wrestle with its closely-printed pages. Here and there he may fail even with these adventitious aids to cerebration. On page 89 is a short paragraph dealing with the relation of nitrogen metabolism in pregnancy to vitamin B and the lymphoid tissues. After reading this paragraph several times on different occasions one reader, at any rate, was still entirely in the dark as to the author's meaning.

Dr. Fairbairn probably does not rate very highly the educational value of illustrations; in his 744 pages there are only 129 textual illustrations and four plates. In this respect he expects too much of his readers: unillustrated descriptions of anatomical form and structure are almost impossible to follow unless one is already acquainted with the things described, yet there is not a single picture of histological structure in the whole volume. Even when, as in the case of "chorio-epithelioma," it is stated that the diagnosis depends largely on the microscope, no illustration of the microscopic appearances is given (p. 120).

The general impression is gathered that the author does not think much of the old pathology which was concerned with cellular form and character; on the other

hand, the new pathological chemistry makes a strong appeal to his mind, and he has clearly given it close attention. It is, however, permissible to remark that a knowledge of organic structure, and the changes produced by disease, are still a fundamental requirement in every branch of medicine. Criticism on this point is probably anticipated, for in the preface it is stated that "pathological descriptions have been restricted . . . . because pathology has its own place in the curriculum, its own teachers, examiners and examination." Precisely the same may be said of physiology, yet it has been thought necessary to discuss the physiology of reproduction very fully. As a matter of fact, the pathology of the reproductive tract is not dealt with adequately by the general pathologist, and the student must get his instruction in it from the gynæcologist or he will pick up but an indifferent smattering of the subject.

Before the author could settle down to his work, so to speak, he felt that he must write a prologue; it is printed in smaller type than the general text, in order to show that its perusal is not a matter of urgency. It sets forth a learned account of the obstetrics of the ancients, does justice to the position of Soranus, and then passes easily to the place of obstetrics in relation to recent developments. The final paragraphs on the "New Outlook" embody the author's ideals, and deserves to be carefully read by all—teachers and students alike.

The first section is concerned with the anatomy, the development and the physiology of the genital organs. Reproduction is dealt with quite rightly as part of the normal functions, and the description of the early stages of development is adequate, but somewhat difficult to follow owing to the spareseness of the illustrations. The references to the cognate subjects of heredity and sex-determination could very well have been omitted, especially as no definite pronouncement can be made about either. The account of menstruation is inadequate, especially in regard to the cyclical changes in the endometrium which are of fundamental importance in relation to the pathological changes in that structure.

In the section dealing with the management of pregnancy, it is surprising to find that little emphasis is laid upon the necessity of frequent examination of the urine. In describing the general examination of a pregnant woman the statement is made that "the routine examination of the urine is essential," but no further reference is made to the matter except that "observation on the lines of this examination will be continued at intervals in accordance with the needs of the case." The author lays stress upon the importance of examining the thyroid and the mouth, and he is evidently in favour of a somewhat stern asceticism being imposed upon expectant mothers, for he says that "close and stuffy rooms, theatres, concerts and late hours should be banned"—which does not leave many of the amenities of indoor life open to the patient!

The section dealing with abortion is, in its general features, eminently practical, and emphasis is laid upon the advisability, too often overlooked, of making a systematic enquiry for the cause in every case. Special attention is paid to the medico-legal bearings of criminal abortion, and the circumstances are explained under which practitioners may unwittingly make themselves liable for "misprision of felony"—an offence which most of the author's readers will hear of for the first time. We are not told what punishment this offence carries, but the name is sufficiently forbidding to enjoin caution, which is probably the author's main reason for referring to it.

The subject of hyperemesis is dealt with in an independent and somewhat summary manner, and the author's conclusions will need careful examination. He recognizes only one form of excessive vomiting in the first half of pregnancy, namely, the hysterical, and proposes to apply the term "pernicious" to cases in which "vomiting is the only symptom" and no other cause than a nervous one can be found. This reversal of established views is supported by an account of the symptoms of Charlotte

Brönte's fatal illness as described by Mrs. Gaskell, and which the author regards as proof that she died of hysterical vomiting. He does not, however, tell us anything about a urinary examination, and the assumption that the vomiting was hysterical appears to be based on insufficient data. The author has completely absorbed the view of the psychotherapists on this question, and is convinced that what he calls " pernicious vomiting " can always be cured by isolation and suggestion. The author does not appear, however, to be entirely convinced of his own opinions, for two pages further on, in considering the toxæmia of pregnancy, he remarks that " hyperemesis or toxic vomiting is presumed to be of the same (*i.e.*, toxæmic) character," and it is recognized that many " functional " disorders may reasonably be presumed to have their origin in some form of intoxication.

The chapter dealing with " the toxæmia of pregnancy " including eclampsia is perhaps the most interesting in the book, and will be read wth profit by all. It is not overburdened with theories of causation, which are unprofitable, but great attention is paid to biochemical methods of clinical investigation, and an attempt is made, for the first time it would appear, to give practical effect to the results which have been reached by bio-chemical observers.

The author's view is that in every case of albuminuria, however slight, the tests for renal efficiency should be at once applied, in order to distinguish those associated with chronic nephritis from the pregnancy toxæmias. This is a hard saying, for these expensive investigations are quite beyond the reach of the average patient or practitioner. When other symptoms, such as œdema and rise of blood pressure, are associated with albuminuria, Dr. Fairbairn believes that these investigations may be made to yield a definite and reliable indication for treatment, and this point is fully explained. The practical difficulty arises, however, that it is rare to find two bio-chemists working independently who obtain anything like concordant results in comparable cases.

Our author believes that with the aid of biochemical tests it is possible to distinguish between an " acute " and a " subacute " form of toxic albuminuria. The former is associated with grave risks of eclampsia, but in the event of recovery, leaves no permanent renal damage; the latter, on the other hand, is attended by no immediate risks, but is associated with considerable danger of chronic renal impairment. This will form a most valuable contribution to our knowledge of the subject if experience should show it to be well founded.

The treatment of the physiology of labour is fresh and original; the author has succeeded in divesting his mind entirely of what may be called " accepted " views. He boggles (to use his own expression) a little over ' retraction ' and ' polarity,' but having demonstrated at considerable length that the process of emptying the uterus does not differ from that of any other hollow viscus, such as the bladder, he allows us to retain these old familiar terms.

The attention of teachers should be directed to a very careful schematic representation of the causes of atonic post-partum hæmorrhage on p. 332. Uterine inertia is defined as a " costive action of the uterus," and the author will not have it that this condition is either primary or secondary. In the prevention of this condition the choice of a nurse is said to be of extreme importance; she must be neither talkative and fussy, nor diffident and over anxious, a dictum which would appear to exclude many nurses that we know of. It is, however, a real service to point out how clearly the inefficient action of the uterus depends upon psychical disturbance in the great majority of cases.

It is not until we come to the section dealing with obstructed labour that we find the new plan of a combined text-book involves any great departure from the usual arrangement of subjects. It is somewhat of a shock, however, to find that rupture

of the uterus in labour is relegated to gynæcology, and described along with other "mechanical lesions."

The section dealing with the management and feeding of babies is probably the best account of the subject which has ever been written by an obstetric teacher; it contains a wealth of detailed and practical information which will prove of the greatest value to students. The author's mnemonic for the constituents of milk is characteristic of his picturesque methods, and may be quoted in full: "The human animal walks on two legs and the percentage of its protein is two; add another two making four for fat, and another two making six for carbohydrates; the cow walks on four legs, and the percentage of each constituent is about four."

We come to the "Diseases of the Reproductive Tract" in part 6, and their consideration, along with the operative treatment, occupies 253 pages out of a total of 744. It is therefore obvious that this part of the combined subjects is dealt with much less fully than the obstetric part. The author has adopted the pathological classification of Professor Fothergill, and has included in the section several subjects usually regarded as obstetric, such as rupture and inversion of the uterus, perineal laceration, and puerperal sepsis.

One of the key subjects in gynæcology is prolapse, and the author's treatment of this subject will be followed with interest. In his classification prolapse is a "mechanical lesion," whatever that may mean; traumatism and infection are agreed to be its progenitors, but the system necessitates it being placed in the same class as other conditions, the causation of which is entirely different.

The Edinburgh conception of the pelvic floor as consisting of an anterior movable and a posterior fixed portion, which Berry Hart did so much to popularize, is taken as the basis of the author's explanation of the manner in which prolapse is produced. The explanation is clear and satisfactory so far as it goes, but the account of the anatomical displacement in cystocele is not very full. The description of the operative treatment of prolapse is brief, but clear and easily followed. The author turns aside for a moment to scold "those without understanding who perform hysterectomy even in these enlightened days." His subsequeut remarks, however, show that he is himself without understanding of the operation of vaginal hysterectomy for prolapse as performed in the United States very widely and with great success. After removal of the uterus the edges of the broad ligament are stitched together in the median plane of the pelvis, and their anterior margins attached to the sub-pubic ligament. In this way the bladder is well supported. The operation is perhaps one which need not be discussed in a students' text-book; neither should it be held up to unmerited scorn.

Chronic endometritis is admittedly a difficult subject to deal with, and the author is not sure whether in his system it is an "infection" or an "overgrowth." He regards "chronic metritis" as an "overgrowth," however, without any qualification. The important work of Hitschmann and Adler is not referred to, nor is any reference made to the diagnostic difficulties arising from the cyclical changes which occur in the endometrium under normal conditions. Except in the matter of arrangement the author's treatment of the morbid conditions of the ovary and uterus does not depart from conventional lines, and therefore does not call for comment.

An interesting chapter follows dealing with "Conditions Simulating Disease of the Reproductive Tract," in which appendicitis and nervous and psychical conditions are discussed. The latter subject is fully considered, and points are developed which show that our author has made a somewhat close study of the functional element in women suffering from gynæcological troubles. The student and the average teacher alike will profit greatly by a careful perusal of these pages: psychology is characterized conspicuously by its general elusiveness, but Dr. Fairbairn almost makes us believe that we have got hold of something.

The last section also constitutes a new departure dealing with the duties of midwives, vital statistics, eugenics and birth control. This is a wide sweep of the net, and many a hard-driven student will take advantage of the author's suggestion made in his preface, that they may be remitted to a more convenient season.

It will be readily conceded that Dr. Fairbairn has broken fresh ground. The Scottish combined text-book was conceived upon conventional lines except that both subjects were considered within the covers of a single volume: they were, however, kept distinct from one another. Dr. Fairbairn has attempted to blend them, and has transferred to gynæcology a number of conditions which arise as obstetric complications, such as puerperal fever and injuries to the birth canal. There is no apparent advantage in taking rupture of the uterus out of its natural setting, which is undoubtedly obstructed labour; clinical association is surely of greater importance than adherence to any scheme of pathological classification, however logical this may appear. In the same manner puerperal infection is treated along with venereal and tuberculous infections, to the disregard of its natural place in relation to the puerperium. Another curious result of this system is that a student interested in the subject of perineal lacerations, will find himself referred to three different sections, as he passes from their prevention by proper management of the delivery of the head, to their character and extent (mechanical lesions) and thence to the methods of suture (gynæcological operations). This may be logical, but it is vastly inconvenient. The general principle that each subject should as far as possible be kept in its normal clinical relations is a sound one, and a scheme of classification which ignores it is likely to lead to confusion and loss of time.

Much of the clinical part of the book is written in what might almost be called a conversational style: in consequence it is somewhat diffuse or even prolix, but it has the compensatory advantage of disclosing glimpses of the personality of the author which the general reader will find very intriguing. In other parts the author has probably realized that he is a somewhat stiff proposition, for he has brightened his more serious moments by topical allusions to such matters as "strikes," "black-leg labour" and "Mr. Micawber."

Before another edition of his book appears it is to be hoped that the author will reconsider the question of illustrations. Reference has already been made to their scanty numbers: not only are they too few, but those which do appear are not always happily conceived. Figure 94, illustrating Sylvester's method of artificial respiration, gives the painful impression of an emaciated infant being stretched on the rack by two merciless pair of gloved hands. The other illustrations of this method also embody the idea of limbs being forcibly stretched. Abdominal palpation is badly illustrated. In Fig. 48 the patient appears to be palpating her own abdomen, having first detached her arms and partly hidden them under the sheet. In Fig. 49, the palpating hands appear to belong to an observer who has concealed himself from view under the couch. Delivery of the head, and manual rotation of the head during labour, are represented with ungloved hands, although in the text the routine use of gloves is advised.

No reader will dip into this book without being struck with the general attitude of the writer to his subject; he brings to his work lofty ideals and a wide humanitarianism which make a strong appeal to the reader's sympathies. He displays an almost missionary zeal in urging the student to regard his patient as something more than a "case"; to study her environment, and the economic and temperamental difficulties with which she may have to contend. Whatever the verdict of the future may be upon its general plan and scope, it will be honoured for its tone and temper as much for its wealth of solid information. T.W.E.

"Clinical and Operative Gynæcology." By Prof. J. M. Munro Kerr, M.D., F.R.C.P.&S. (Glas.). London: Henry Frowde, and Hodder and Stoughton, 1922. Price, 50/- net.

This book presupposes some previous knowledge of gynæcology, so is not intended for the student, but for the practitioner, the gynæcologist, and especially for the younger man commencing the special study of gynæcology, it is an excellent work, and cannot be too strongly recommended.

The whole field of gynæcology is covered, and the table of contents differs little from that of any ordinary text-book, but the subject matter is quite fresh.

Each subject is treated chiefly from the clinical aspect. This does not mean that pathology and historical description are entirely eliminated; they are treated adequately but subordinated to the clinical description, and given in such a way as to be helpful to the gynæcologist studying a clinical case rather than to the laboratory worker.

All the old shiboliths, religiously copied from text-book to text-book are dropped and each section treated with a freshness which makes the book delightful reading. The author's own views are freely given and points illustrated by numerous quotations from notes of his own cases but in all controversial subjects the views of other workers are so fairly given as to disarm criticism. It is only a man of great clinical experience, with a fresh, vigorous and unbiassed mind who could usefully write a book of this description, and that he has produced one of such high merit and general usefulness still further enhances his reputation as a gynæcologist.

Another commendable feature is the fact that the author confines himself solely to gynæcology. In one chapter are mentioned some of the general surgical conditions which may be accidentally encountered when opening the abdomen and which every gynæcologist must be prepared to meet and treat, but the point is emphasized that these are accidentally encountered along with gynæcological conditions, and no encouragement is given to the view held by one section of gynæcologists that this subject embraces all conditions found in the abdomen.

We are very pleased to note the emphasis laid on the fact that gynæcology is not merely a branch of surgery, and, while the subject is definitely limited anatomically, there is no limit to the method of treatment of the pathological conditions found in these organs, and medicine, radiation, organotherapy, etc., are as much the province of the gynæcologist as is surgery.

The book is copiously illustrated, but here again there is an individuality and point which is so often missed when illustrations are copied from other books. We have been unable to find a single illustration which does not clearly show what the author wishes to express, and often a page of pictorial illustration saves many pages of descriptive writing, notably two pages of small illustrations in the chapter on examination which quickly and clearly shows the various pathologcal conditions found in the pelvis.

There is a long section on operative treatment, but here the author chiefly relies on a series of clear and original drawings with only short but very clearly expressed description, and so the reader quickly and without effort grasps the salient points.

It is a large volume, but the freshness of view and the enforced and vigorous descriptive matter makes it much more easily read than many of the shorter text-books. The type is good, the paper excellent and the illustrations beautifully produced, all important points in reducing fatigue in the student and keeping the interest fresh.

We have read through the book with much interest and profit, and very strongly recommend it to all teachers and advanced students of gynæcology.

Wm. Fletcher Shaw.

"A Short Practice of Gynæcology for Medical Students." By HENRY JELLETT, M.D., F.R.C.P.I. Fifth Edition. London: J. and A. Churchill, 1924. Price 18/-.

TEXT-BOOKS for students, and especially successful text-books, are always of interest to teachers as illustrating fresh methods of presenting their subject and indicating the characteristics of other schools. The one before us is written by a former Master of the Rotunda Hospital and Professor in the University of Dublin, and has reached a fifth edition, thus proving but little less successful than its better-known companion volume on Midwifery.

The foundation on which the future practice of the student must be built is a knowledge first of normal structure and functioning and how they can be maintained; then of disease and injury, their nature and results, their causes and prevention, and, finally, of their early recognition and the best means of cure or relief. Our purpose will be to judge how far this book will serve to lay this foundation.

Dr. Jellett has no anatomical chapter, justly assuming that the student has been taught that subject elsewhere, but he has included some very excellent illustrations to remind the student of the salient points of pelvic anatomy. The physiology of the menstrual cycle and the histological changes in the endometrium are well described and illustrated, but the hygiene of menstruation is overlooked.

Gynæcological disorders are considered in anatomical pigeon-holes, although that arrangement has now generally been discarded as unscientific and useless in practice. No adequate conception of the results of the infections of the reproductive tract can be obtained by discussing them as if they were limited by anatomical boundaries. What possible clinical value will the student find from being taught, as is done here, that acute and chronic oöphoritis may be subdivided into cortical, parenchymatous and interstitial?

Under "Diseases of the Uterus" are included 'displacements,' with all the trifling variations of that organ from its mean position, and some 40 pages and 30 figures are required to explain the useless and archaic terminology of this bewildering subject, even to ante- and retro-, sinistro- and dextro-, versions, flexions, positions and torsions. The figures showing a dozen uteri in what seem to be various attitudes of intoxication,—especially those 'in the lateral plane' where they appear to be leaning up against an invisible lamp-post—can serve no more useful purpose than that of sending the student from this book to his bed with his brain in a whirl. When not mere anatomical variations, most of the conditions described are physical signs and not pathological entities, and to consider them under uterine diseases and with an extravagant nomenclature is to give an entirely erroneous impression of their meaning and importance.

The investigation, diagnosis and causation of pelvic disease is adequately described, but too little emphasis is laid on the preventive aspect. Treatment, medical and surgical, is fully dealt with, and our only criticism in regard to it is the lack of proportion and absence of any attempt to pick out the suitable cases for specific lines of treatment.

As shown by its "Contents" the most striking feature of the book is the disproportionate attention given to the minutiæ of operative procedures,—which are not the foundation but the superstructure of the student's training. The first part of the book is entitled "Gynæcological Diseases and Their Treatment, including Minor Gynæcological Operations," and the second, "Major Gynæcological Operations," the latter occuping one-quarter of the book. This proportion does fully represent the space devoted to details of technique, for examination of Part I shows that among the minor gynæcological operations are included amputation and repair of the cervix, colporrhaphies, repair of fistulæ and such like, thus bringing the space occupied by descriptions and illustrations of operative measures up to about one-third. Over-

emphasis of the side of technique might be excusable had only classical, well-established and essential procedures been selected, but the very reverse is the case. There is, for instance, a description, illustrated by two figures, of an unusual and difficult operation for the formation of a new urethra after injury during labour, and pages are devoted to operations which have either never been generally practised or have become obsolete; for example, ignipuncture of the ovaries, the shortening of the uterine ligaments, interposition of the uterus, the repair of the cervix when torn in child-birth and incisions to produce the same condition when the patient has not had a labour to do it for her.

The author's remarks regarding division of the cervix may be quoted:—"It is an operation of considerable value, as it brings about the relief of dysmenorrhœa or the apparent cure of sterility, and in such cases its performance is justified by its results. It is, however, none the less true that it produces a pathological condition closely resembling that caused by tearing the cervix during labour, i.e., an exposure of the mucous membrane of the cervix to the action of the vaginal discharge and the vaginal micro-organisms. In consequence, it not infrequently leads to such after-symptoms as leucorrhœa and pelvic pain, and then on examination of the cervix a condition of ectropion may be found. Consequently a second operation may be required to cure the ectropion. In spite of this, however, the division of the cervix is quite permissable and advisable when there are clear indications for its performance."

How far the indications given are clear or offer sufficient guidance to the student or young practitioner in selecting his cases may be gathered from a further quotation: "Division of the cervix may be indicated under the following conditions when they are associated with sterility or dysmenorrhœa, and have not been relieved by non-operative measures:—

(1) Acquired or congenital stenosis of the cervical canal.

(2) Acquired or congenital acute anteflexion of the uterus."

Though our view is that the book is ill-balanced—a top-heavy superstructure of operative detail having been erected on a narrow foundation—and does not meet the modern needs of the student, we also recognize that this objection would be met if the book was divided into two, corresponding to the two parts of the present one; the one book would meet the needs of the student and the other that of those practitioners who operate on pelvic cases. In one book the perspective is all wrong.

JOHN S. FAIRBAIRN.

"Uber eingelbildete Schwangerschaften." Von Doz. Dr. R. HOFSTATTER. Wein: Urban and Schwarzenberg. Price, Swiss francs 2.25.

THIS monograph on Imagined Pregnancies records some original cases, and gives a compendious study of the literature of the subject. Although the writer is not altogether convincing in presenting his thesis, it may be well, in case others may wish to look into the subject, to indicate the line he takes.

A characteristic gait and carriage, prominence of the abdomen, pigmentary changes, colostrum-like fluid in the breasts, amenorrhœa and other manifestations occur in an imagined pregnancy, but are not present in a feigned pregnancy. The explanation offered is an endocrine disorder (*e.g.*, the pigmentary changes from adrenal over-action consequent on ovarian deficiency). The most usual condition is over-functioning of the hypophysis with ovarian exhaustion. Though there are no accurate clinical methods of estimating endocrine efficiency, pregnancy is the grand test; not only a real one, but also an imaginary one, arising from strong auto-suggestion, will test the functional powers of the ductless glands. Indeed, recorded cases of false pregnancy without signs

of deficient ovarian function, are, according to the author, really cases of wilful deception and not the true imagined variety.

Treatment by thyroid, followed by pituitary and ovarian extracts, is described as producing successful results. Afterwards the psychological factors are considered, and the exhaustive nature of the monograph may be gathered from the remaining headings,—feigned pregnancy, imagined and feigned extrauterine pregnancy, imagined pregnancy in men, and pseudo-pregnancy in animals. JOHN S. FAIRBAIRN.

MINISTRY OF HEALTH.

"Reports on Public Health and Medical Subjects": No. 25, Maternal Mortality. By JANET CAMPBELL, M.D., M.S., Senior Medical Officer for Maternity and Child Welfare, Ministry of Health.

THIS report is divided into three sections. The first of which is statistical. In it are set out in tabular form the death-rate and maternity mortality in England and Wales since the beginning of the century, together with a graphic representation of the rates for the individual administrative counties.

Statistics always intrigue us. We were never a Senior Wrangler, but what arithmetic we can remember makes us feel that Miss Campbell is a trifle sweeping in her opening paragraph: "As is shown by the following table, the general death-rate has been reduced by one-third, and the infant mortality rate has been halved since the beginning of the century, yet the maternal mortality rate is little lower than it was." The table gives the figures as follows: "In 1900 the general death-rate is 18.2, and in 1922 it is 12.8; a reduction of 29.7 per cent. In 1900 the maternal death-rate is 4.81, and in 1922 it is 3.58; a reduction of 25.6 per cent. The maternal death-rate from puerperal sepsis alone in 1900 is 2.18, and in 1922 it is 1.46; a reduction of 33 per cent. Maternal deaths from other causes than sepsis show a reduction of just under 20 per cent." The actual figures, however, are appalling enough to demand every effort to improve the conditions of what should be a normal physiological function.

The second section is a very full and careful investigation into the possible causes of this high death-rate. The counties of Brecon, Montgomery, Pembroke, Cumberland and Westmorland are examined in detail as to the conditions which may have some bearing on this high mortality. In the summary Miss Campbell states that the problem is largely one of ignorance and geography. The influence of geography is not quite so clear. How does the geography of Montgomeryshire differ from Devonshire, Cornwall or Derbyshire? Counties almost equally mountainous, and with poor communications, yet enjoying comparatively low mortality. The absence of maternity beds and ante-natal clinics in these five counties is striking. No details as to these conditions are given in counties with a low death-rate, so a direct comparison is not possible. There is even less evidence of special features in the sixteen towns with the highest death-rate, except that all but three (Blackpool, Hastings and Bournemouth) are industrial towns. Direct comparison is again impossible, as no table of rates for the individual towns is given, but Miss Campbell draws attention to the fact that the predominatingly industrial district of West Ham actually has the lowest maternal mortality of all the county boroughs. There are some very active ante-natal organisations and a good proportion of midwifery beds in this borough, whereas in the towns with the high death-rate, both these conditions appear to be lamentably lacking.

Several cases are cited to "illustrate the unsatisfactory professional care which some patients have in fact received." "Unsatisfactory professional care" is very

restrained. For actions much less reprehensible the Central Midwives Board would erase the name of a nurse from its rolls.

As regards predisposing factors, Miss Campbell discusses the possible effects of rickets, employment of women, housing, venereal disease, etc. Except in regard to the employment of young girls, and rickets, which may have a bearing, in that both tend to produce contracted pelvis, the evidence seems to show that the other factors have not much effect.

Miss Campbell is to be congratulated on a very fine essay on puerperal infection. She quotes literature dating from 1773, and sums the situation very thoroughly. The complete failure of compulsory notification receives much consideration, and the suggestion that the Obstetrical Section of the Royal Society of Medicine, or the Royal College of Physicians, might be invited by the Minister of Health to frame as exact a definition of puerperal sepsis as is practicable is worthy of consideration. The suggestions for making the results of notification more attractive, by providing assistance as regards beds and nursing, are distinctly good, and would certainly result in a great increase in the percentage of cases notified.

Miss Campbell has thought it desirable to discuss sepsis at some length, " in view of its preventable nature, and far-reaching consequences." Causes other than puerperal sepsis receive much less notice. Now, deaths from other causes are preventable to a very much greater extent than are deaths from sepsis, firstly, by careful and systematic ante-natal supervision of every pregnant woman, whether multigravida, or primigravida (not " primipara," as Miss Campbell terms them), and, secondly, by providing beds where obstetrical aid can be obtained.

The third section discusses the methods of reducing maternal mortality. It is pointed out, as is generally admitted, that there is room for improvement in the training of the professional attendant. It is also pointed out that steps are already being taken to bring this about. The social and educational measures suggested are good, and could be expanded in time as the education of the subject proceeds. The most careful consideration must be given to the suggestions as to what action the Public Health Authorities may and should take. Investigation by the Medical Officer of Health of all maternal deaths, and of all cases of puerperal infection, whether fatal or not, will raise protest in many quarters, although it must be admitted that much useful statistical information could only be obtained by such a course. Miss Campbell does not tackle the provision of beds for cases of sepsis nearly boldly enough. She rightly criticizes the admission of such patients to fever or Poor Law Hospitals, and suggests that Local Authorities should consider whether enough beds for puerperal infection are provided, and if so, whether these are adequately staffed. Is it not a fact that adequately staffed beds for cases of puerperal infection and abortions are almost non-existant? We would suggest that the Ministry of Health should insist that every maternity home or hospital which is in receipt of any grant from the Ministry or from the Local Authorities must provide an adequate isolation block where these patients can be under the care of the most competent obstetric medical officers of the area. The suggestions for the treatment of the cases of difficult labour are excellent, and the appointment of consultant obstetricians—especially if the practitioners have a voice in their appointment—who could be called in by doctors in times of emergency, and paid a fee by the Local Authorities, will be thoroughly endorsed by everyone who has the interest of the community at heart.

We also consider that the provision of ' hospitals ' staffed and equipped to deal primarily with abnormal cases is of vastly greater importance than the provision of ' maternity homes ' mainly for normal cases. Motor ambulances enable such a hospital to serve a very large area. A " normal " case would successfully deliver herself alone

on a desert island, whereas the abnormal case may require the highest skill and judgment to avert disaster to both mother and child.

In conclusion, we congratulate Miss Campbell on the stimulus her work will give to the urgently needed reforms in the maternity welfare of the country.

L.C.R.

"The Mother Craft Manual." By Miss Mabel Liddiard. Published by J. A. Churchill. Price, 3/6 net.

This book deals with the management of the normal baby, and the means by which it can be assisted to develop, both mentally and physically, on normal lines.

In the introduction Dr. Fairbairn emphasizes the importance of ante-natal care for the expectant mother, and its effect in reducing the infant mortality. He also points out the importance of teaching the mother the best methods of feeding, and training her baby, and not leaving the matter entirely to her instincts.

The simple practical directions given in the first chapter on the management of pregnancy and preparation for lactation will be of great value to all classes of expectant mothers, so also will be those on the preparation of cot, nursery, and clothing. In the preparation of the latter the importance of keeping the child's extremities warm is particularly pointed out, also the injurious effect of the veil so often worn over the child's face. The authoress advises that "the binder should be discarded immediately the cord has separated." Such advice may be disputed as many authorities prefer that an aseptic dressing should be worn until the umbilical wound is healed, in which case the binder is more satisfactory than strapping to hold the dressing in place.

Very clear and concise directions are given for the management of lactation, and these should be of the greatest value not only to the mothers who read this book, but also to members of the medical and nursing professions, who have to instruct and supervise the mother. Very clear directions are given for the preparation of the various forms of modified milk used in artificial feeding. The formula for the emulson which is added to each preparation is not given; this is to be regretted.

Directions for weaning the baby and suitable diets for older children are clearly explained and given. Also the care of the premature baby, and the special points to which attention must be directed. The details of treatment of some of the ailments peculiar to children are also helpful, although we are surprised to find the authoress of this up-to-date book advocates the use of dill water for hiccough, and the practice of keeping the affected limb absolutely dry after vaccination.

There are several useful hints on the management of babies when they are travelling, or when they are living in the tropics.

We are convinced that this book will be of the greatest value to medical students and nurses, and to others who work among mothers and babies. M. W. Sparkes.

"Contracted Pelvis: A Consideration of the Diagnosis, Management and Treatment of this Complication in Obstetrics." By Gibbon Fitzgibbon, M.D., F.R.C.P.I. Master Rotunda Hospital, Dublin. Demy 8vo.; 36 pages; 16 illustrations 2/- net London: H. K. Lewis & Co.

The three lectures delivered in the University of London to advanced students by Dr. Gibbon Fitzgibbon, and published in the *British Medical Journal*, have been issued in this convenient form, and the opportunty has been taken of introducing 16 illustrations.

Review of Current Literature.

DIRECTOR: FRANK E. TAYLOR,
M.D., B.S. (Lond.), F.R.C.S. (Eng.), M.R.C.P. (Lond.), D.P.H. (Cantab.)

THIS Review will contain the lists of contents, and abstracts of the more important articles, from the following journals, with which the "Journal of Obstetrics and Gynæcology of the British Empire" exchanges:—

British.—The Lancet; British Medical Journal; The Hospital and Health Review; Medical Science: Abstracts and Reviews.

Australian.—Medical Journal of Australia.

South African.—Medical Journal of South Africa.

American.—American Journal of Obstetrics and Gynæcology; The Journal of the American Medical Association; Surgery, Gynæcology and Obstetrics.

French.—La Gynécologie; Gynécologie et Obstétrique; Bulletin de la Société d'Obstétrique et Gynécologie de Paris; Revue de Gynécologie et de Chirurgie Abdominale.

Belgian.—Bruxelles-Médical.

Italian.—Annali di Ostetricia e Ginecologia; Archivio di Ostetricia e Ginecologia.

German.—Zeitschrift für Geburtshülfe und Gynäkologie; Archiv für Gynäkologie; Zentralblatt für Gynäkologie; Monatschrift für Geburtshülfe und Gynäkologie; Münchener Medizinische Wochenschrift.

Scandinavian.—Acta Gynecologica Scandinavica.

South American.—Boletin de la Sociedad de Obstetricia y Ginecologia de Buenos Aires.

It is hoped that the Review of Current Literature will keep the readers of this Journal in touch with current work throughout the world. At the end of each year it is proposed to print an Index of all the subjects contained in the articles of the above journals. Arrangements will also be made to include abstracts of important articles on border-line subjects, such as Physiology, Biology and Biochemistry.

LIST OF ABSTRACTORS.

London: J. R. FORREST, DOROTHY N. L. LEVERKUS, M.B., F. E. TAYLOR, F.R.C.S.
Huddersfield: W. E. CROWTHER, M.B.
Leeds: A. GOUGH, F.R.C.S.
Liverpool: ROBERT A. HENDRY, F.R.C.S.
Sheffield: W. W. KING, F.R.C.S.
Glasgow: JANE H. FILSHILL, JAMES HENDRY, M.D.
Sydney: T. FARRANRIDGE, M.B.

Lancet.

January 26, 1924.

*Two unusual cases of intestinal obstruction. WAKELEY, C. P. G.

Early human embryos. KEENE, M. F. L., and HEWER, E.E. (Correspondence.)

February 2, 1924.

*A consideration of the after-results of the abdominal operation for retroversion with notes of fifty cases. BLOOMFIELD, A.

The treatment of incomplete febrile abortion. (Annotation.)

Gynæcology and obstetrics in Scandinavia : the place of Cæsarean section in obstetrics. (Special Article.)

Blood compatibility of mother and infant. DYKE, S. C. (Correspondence.)

February 9, 1924.

*The influence of lead on normal and abnormal cell-growth and on certain organs. BELL, W. B.

Malta fever and epizootic abortion. (Annotation.)

February 16, 1924.

*The use of X-rays in antenatal work. SHENTON, E. W. H., and HORWITZ, C. H. S.

Blood compatibility of mother and infant. CAPON, N. B. (Correspondence.)

March 1, 1924.

*On breast-milk feeding. CHISHOLM, C.

*Tests for cure of gonorrhœa in women. ABRAHAM, J. J.

*A case of chorion-epithelioma. HEDLEY, J. P.

March 8, 1924.

A new method of rationing artificially-fed infants. (Annotation.)

Treatment of uterine fibroids. JORDAN, A. C. (Correspondence.)

March 15, 1924.

Gangrene of extremities in puerperal fever. (Annotation.)

Tests for cure of gonorrhœa in women. FILDES, P., and WESTERN, T. G. (Correspondence.)

March 22, 1924.

*Excision of the rectum : abdomino-vaginal as an alternative to abdomino-perineal excision. BONNEY, V.

The effect of maternal syphilis on the death of the child. (Leading article.)

March 29, 1924.

*A case of intraperitoneal ovarian pregnancy with a full-term child SUVANSA, S.

Theories of placental circulation. (Annotation.)

A new treatment for hyperæmesis gravidarum. (Annotation.)

The Wassermann reaction in the new-born. CRUICKSHANK, J. N. (Correspondence.)

Tests for cure of gonorrhœa in women. ABRAHAM, J. J. (Correspondence.)

Two unusual cases of intestinal obstruction. Both Wakeley's cases occurred in women over 70 years of age, and in each case the intestinal obstruction was caused by adhesions between a twisted teratomatous ovarian cyst and the cæcum.

A consideration of the after-results of the abdominal operation for retroversion. From an experience of fifty cases Bloomfield considers that :—

(1) Cases of retroversion complicating prolapse should be treated as cases of prolapse. Abdominal operation alone rarely, if ever, cures these

cases, and their inclusion in statistics of operations for retroversion leads to confusion.

(2) Retroversion is not a disease in itself and never, with the possible exception of the "Bonney syndrome," gives rise to a definite train of symptoms. It is usually complicated by other pathological findings; and it is these as a rule which indicate operative treatment, and upon which relief of symptoms largely depends.

In this series 80 per cent. of "cure" cases were complicated, while only 70 per cent. of cases unrelieved had complications. Possibly a longer series might show a more marked difference between these two. In cases where no complication is found on clinical examination, and sterility is complained of, operation is sometimes indicated, as closed tubes may be present, and a better chance of conception seems to be given after dilatation of the cervix if the uterus is replaced and retained in the anteverted position.

(3) In many cases an undoubted nervous element is present, the significance of which must be carefully assessed before operative treatment is undertaken, and in considering the result of after-treatment.

(4) Too few cases of pregnancy occurred in this series to enable any statement as to its effect to be made, but from a consideration of the results of others pregnancy does not seem to exert any deleterious effect on orthopædic and clinical results of treatment.

The influence of lead on normal and abnormal cell-growth and on certain organs. This is the full account, with illustrative plates, of the address given by Blair Bell before the North of England Obstetrical and Gynæcological Society, and of which a full abstract may be found in the Transactions of the Society published in the Spring Number of this Journal (see page 144).

The use of X-rays in antenatal work. The authors consider that X-rays provide a ready and easy means of obtaining accurate knowledge of the size of the baby's head relative to that of the maternal pelvis. They also consider that the time at which ossification makes the fœtus visible will vary very considerably. In a recent case it only became visible at the beginning of the seventh month. In a few cases stereoscopy has proved of value.

On breast-milk feeding. Chisholm considers that although all doctors and nurses continually advise breast-milk there has been too little teaching and too little study of the best way of preserving the supply for the child and ensuring its proper quality. An excellent account of the subject will be found in this lecture.

Tests for cure of gonorrhœa in women. Abraham believes that, with the present technique, the complement-fixation test, as an indication of cure, if positive, when all the other signs are negative, may be neglected. For practical purposes clinical and bacteriological tests may be relied on. If these tests are negative they should be repeated two months later. If again satisfactory repeat in four months. It may safely be assumed that the patient is cured if, at the end of six months without treatment, there is no

sign of return, clinical or pathological. A year later, if a repetition of the tests is negative, she can safely resume marital life. If fresh manifestations show themselves after such a series of tests, either the method of testing is at fault or the patient has acquired a fresh infection.

A case of chorion-epithelioma. Hedley records a case of chorion-epithelioma with the following points of special interest:—(1) The chorion-epithelioma followed an extra-uterine gestation, but appeared as an intra-uterine growth; (2) three large polypi were removed per vaginam from the uterus within six months, and the area of attachment to the wall was of about the same extent in each case; (3) the periods returned and were regular and not excessive between the removal of the first and second polypus; (4) spicules of bone were found in the first, and calcareous areas in the third polypus; (5) there was no ascites although the main mass of growth was intra-peritoneal.

Excision of the rectum: abdomino-vaginal as an alternative to abdomino perineal excision. In a recent case of cancer of the rectum in a feeble woman between 60 and 70 years of age, Bonney opened the abdomen and divided the bowel above the growth. He then stitched up the lower end of the upper portion and did a colostomy. A peritoneal floor was then made. The lower portion was ligatured and separated and then pulled through an incision in the posterior vaginal wall. It was then divided two inches from the anus and removed. The operation was relatively easy and rapid; there was little bleeding and no shock. The patient recovered.

Bonney recommends this operation as an alternative to the classical one, and remarks that the superior ease with which the gap left by removal of the bowel from the hollow of the sacrum can be roofed over by peritoneum is well-marked, especially by contrast with cases of abdomino-perineal excision. The avoidance of the perineal incision and the cutting of the levators, which is the stage where most of the shock and bleeding is incurred in the abdomino-perineal operation, is a great gain, and where the growth is above the level of Douglas's pouch (and it is for such cases that the operation is specially suitable) the non-removal of the last inch or two of the bowel will not materially influence the patient's chances of cure.

If it be desired to remove this last two inches, the middle-line incision in the posterior vaginal wall could be carried down to the vaginal orifice and continued round the anus from that point, thus minimizing the extent of the perineal wound and avoiding excision of the coccyx.

A case of intra-peritoneal ovarian pregnancy with a full-term child. Suvansa removed a full-term female child from the peritoneal cavity of a multipara aged 37, by laparotomy. The placenta was adherent to the under surface of the liver and the abdominal wall. It had a downward process which seemed to envelop the right ovary and the cæcum. The uterus was the size of a three months' pregnancy. The uterine tubes and left ovary appeared to be normal. The infundibulum of the right tube was implicated in the placental process. The placenta was left behind for fear of uncontrollable bleeding and the abdominal wall was closed in separate layers. The child survived, but the mother died. F. E. T.

British Medical Journal.

January 5, 1924.

*Carbon monoxide poisoning during pregnancy. PHILLIPS, P.
John Memis, M.D., a protagonist of obstetric teaching. (General Article.)

January 12, 1924.

Posture during delivery. BELL, H. W. (Correspondence.)
Placenta prævia and eclampsia. KIRK, S. E. (Correspondence.)

January 26, 1924.

A mucous polypus of the uterus causing post-partum hæmorrhage. NYALUSY, F. A.
Early human embryos KEENE, M. F. L., and HEWER, E. E. (Correspondence.)

February 2, 1924.

*Contracted pelvis. FITZGIBBON, G.
*The effect of thyroid and ovarian gland extracts in cases of previous miscarriage and stillbirth. WHITE, A.

February 9, 1924.

*Contracted pelvis. FITZGIBBON, G.
Forgotten swabs. MORISON, R.

February 16, 1924.

*Contracted pelvis. FITZGIBBON, G.
*" Vesicalization " of the stump of the cervix uteri. ASHE, E. O.
Cæsarean section : suppuration : recovery. STEELE, L. L.
Contracted Pelvic Outlet. BELL, W. B. (Correspondence.)

February 23, 1924.

*Treatment of uterine hæmorrhage not due to pregnancy or new growth. VARLEY, G. H.

March 1, 1924.

*Two cases of interstitial obstruction. PIDCOCK, B. H.
*The " toxæmias " of pregnancy. COOK, F.
Contracted pelvic outlet. LOCHRANE, D., GRAY, J., FITZGIBBON, G. (Correspondence.)

March 15, 1924.

Contracted pelvic outlet. BELL, W. B. ((Correspondence.)
Treatment of uterine hæmorrhage by radium. ROY, D. W. (Correspondence.)

March 22, 1924.

Maternal syphilis. (General Article.)
Orchitic and ovarian extracts. BRADFORD, A. (Correspondence.)

March 29, 1924.

Treatment of fracture of humerus at birth. FROGGATT, W.
Pituitrin in asphyxia pallida neonatorum. CORMACK, J. G.
Hæmorrhage in the new-born treated by injection of paternal blood. EYRES, H. M.
Contracted pelvic outlet. FITZGIBBON, G.

Carbon monoxide poisoning during pregnancy. A married woman, aged 24, when six months pregnant was " gassed " whilst asleep, through leakage

from a fractured road main filling the house with coal gas. She was unconscious on admission to hospital, with stertorous breathing, pulse almost imperceptible, and a pinkish grey complexion. She recovered consciousness in three hours after treatment with camphor injections, stimulants and oxygen. Two months later labour commenced spontaneously. The uterus contracted feebly and the child was delivered with forceps. Severe post-partum hæmorrhage followed. The child weighed two pounds and appeared to be of six months development. Phillips thinks the fœtus died at the time of the "gassing," and that the dose of carbon monoxide was insufficient to kill the mother, but caused the death of the six months fœtus, while its presence modified the process of maceration. The contractile power of the uterus was also diminished, and this might account for the retention of the products of conception being retained for two months.

Contracted pelvis. Fitzgibbon delivered three lectures on contracted pelvis for advanced students in the University of London. He pointed out that although a very large number of types of contracted pelvis have been described, yet for practical purposes they can be divided into four main groups containing the majority of cases and one miscellaneous group, including the irregular and rarer types. The four main groups are: (1) the symmetrically contracted pelvis, (2) the small round pelvis or transversely contracted pelvis, (3) the generally contracted flat pelvis, (4) the simple flat pelvis, and he points out that these are all dependent upon the length of the diameters compared with the normal standard, and each group includes variations of the ratio of the diameters so that the different groups approach each other. An excellent systematic account of the diagnosis, clinical examination and treatment of each of these groups from the Dublin point of view is then given.

The effect of thyroid and ovarian gland extracts in cases of previous miscarriage and stillbirth. The results of eighteen months' experience of this method of prophylactic treatment at the Sheffield Maternity and Child Welfare Centre are thus summarized by White:—

(1) In 90 per cent. of cases the baby was born alive, and this might have been raised to 100 per cent. if the mother had continued treatment to term. In 70 per cent. the baby lived and did well.

(2) Out of twenty-three possible babies which might have been born to these patients previously, only three were born alive, and in only two cases the baby lived. In both cases the babies were small at birth and difficult to rear.

(3) In only two out of ten cases the mother has another living baby. In both cases two miscarriages or stillbirths have occurred in between, and in one of these two preceded the first living baby.

(4) The two babies who died survived for one month and eighteen days respectively, while other much smaller babies attending the clinic have done well.

(5) Three of the babies were above average weight at birth.

(6) The smaller babies attending the clinic have done well and gained more rapidly than normal.

(7) All the babies are breast fed.

(8) All the confinements were normal.

(9) It is advisable to begin the treatment at five months or earlier, as the baby then tends to be bigger.

(10) The health of the mother during pregnancy was greatly improved after commencing treatment.

"Vesicalization" of the stump of the cervix uteri. The term vesicalization is employed by Ashe of Kimberley to describe the procedure he successfully adopted in the treatment of a vesico-vaginal fistula following subtotal hysterectomy, in which he incorporated a portion of the cervix in the bladder wall.

Treatment of uterine hæmorrhage not due to pregnancy or new-growth. Varley records eight cases of metrorrhagia and one of hæmorrhage from the cervical stump following subtotal hysterectomy successfully treated by the application of radium bromide.

Two cases of intestinal obstruction. In the first of these cases the intestinal obstruction was due to strangulation of a loop of small intestine through the left broad ligament of the uterus in a woman aged 35. The strangulating agent was the left round ligament. The author can find no published record of a similar condition.

The "toxæmias" of pregnancy. In this Hunterian lecture delivered before the Royal College of Surgeons, Cook gives a reasoned criticism of the various views which have been held on the toxæmias of pregnancy with reference to the albuminuria of pregnancy, eclampsia, "accidental" antepartum hæmorrhage and the vomiting of pregnancy, and carefully considers the numerous biochemical observations which have been made in recent years. He considers that biochemical investigations have hitherto failed to elucidate the fundamental factors of these problems: they have reflected the results of derangement but they have not thrown light on etiological antecedents.

The nature of his argument precludes a summary of conclusions. He believes, however, that we should regard individual cases without preconceived diagnosis or theory, and continue to investigate them with every means at our disposal; that we should accurately record our observations without inductive comment; that we should reconsider and further examine the vascular conditions of pregnancy in general and in detail; and that we should not proclaim the existence and influence of toxic agencies until they have actually been demonstrated. F. E. T.

The Medical Journal of Australia.

January 5th, 1924.

Some notes on ectopic gestation. MARKS, ALEX. H.

February 2nd, 1924.

Dystocia due to a large fœtus. RIDLER, H. A.

February 16th, 1924.

*Acute hydramnios simulating an acute abdomen. FARRANRIDGE, T.

February 23rd, 1924.

Pubiotomy. O'BRIEN, D. P.

March 8th, 1924.

General œdema of the fœtus. FLETCHER, W. M. A.

March 29th, 1924.

*Retro-displacement of the uterus and its treatment. SCHLINK, H. R.

Acute hydramnios simulating an acute abdomen. Farranridge records a case in which a primigravida aged 27 was stated to have had three definite attacks in the appendiceal region within 48 hours, the first with vomiting and severe pain. She was seven months pregnant, and the pregnancy had previously been uneventful. The abdomen showed recent striæ, a stretched umbilicus, absent respiratory movements, and an enormous general uniform distension. There had also been some loss of blood *per vaginam*. The os was fully dilated, the membranes were intact, and a small head was bulging and fully "ballotting." The membranes were ruptured and two living male fœtuses, weighing 2.5 pounds and 2.75 pounds respectively were extracted. Several litres of liquor amnii escaped. The third stage was normal, the placenta being a large single one. The condition at once improved, so that the acute abdominal emergency was now at an end.

Farranridge states that recently there have been several patients with subacute and chronic hydramnios at the Royal Hospital for Women in Sydney, and that these conditions have been often found associated with monsters, with congenital malformations like spina bifida, anencephalus, ectopia vesicæ, hare-lip, with multiple pregnancy (as in the case here recorded) and with premature and macerated fœtuses. F. E. T.

Retro-displacement of the uterus and its treatment. The author points out in his preliminary account of the anatomy of displacements that the factors maintaining the uterus in position are the covering peritoneal ligaments above, the supporting muscular diaphragm below, the fascial sheaths—vascular ureteral and rectal between these two, and intra-abdominal pressure. He classifies the causes into puerperal and non-puerperal. He deals with the treatment under the four headings—prophylactic, conservative neglect, non-operative, and operative. Pessary treatment is reserved for the old and weakly, for those who refuse absolutely surgical interference; and as a temporary measure for those with a gravid or puerperal acute retroversion. He is very decided about the faults and dangers which he says result from vaginal fixation, ventral suspension or fixation; in his opinion the only suitable operative proceedures are external shortening, internal shortening (Martin-Kelly) and in some instances perhaps the Gilliam's. T. FARRANRIDGE.

The Medical Journal of South Africa.

Vol. xviii, No. 12, *July*, 1923.

*Tubal pregnancy. PRETORIUS, J. C.

Tubal pregnancy. During thirteen years practice of general surgery Pretorius had 32 cases of ectopic pregnancy under treatment, including two cases where the full-term dead fœtus was removed. He considers this condition is more common than is generally believed, and that it is frequently not diagnosed. The possibility of a ruptured tubal pregnancy should always be borne in mind when called to a woman in the child-bearing period who is suffering from pain in the lower abdomen. F. E. T.

American Journal of Obstetrics and Gynæcology.

Vol. 7, No. 2, *February*, 1924.

*Blood sedimentation test as an aid in diagnosis in surgical infections. FRIEDLAENDER, B.

Reflections upon hospitals. KEEFE, J. W.

Cutting the ileo-cæcal fold as a routine measure in the operation for appendicitis. CHANDLER, G. F.

The use of local anæsthesia in handling septic conditions within the abdomen. EMMETT, R.

*The time for operation in ectopic gestation. WELTON, T. S.

Blinders wanted in surgery. MORRIS, R. T.

*The use of X-ray therapy in disturbed menstruation. RONGY, A. J.

*Lesions of the cervical stump of a supravaginally ablated uterus. REDER, F.

Further observations in renal glycosuria of pregnancy. SCHNEIDERMAN, H.

Rational obstetrics from the teaching viewpoint. APPLEGATE, J. C.

A new method of teaching pelvic diagnosis by means of mannikins. JAFFE, J. K.

Results of intermittent aspiratory hyperæmia in gynæcology, with a report of one hundred and twenty-three cases. BRADLEY, R. L.

Labour injuries to the coccyx and their treatment. HIRST, J. C.

SELECTED ABSTRACTS. Sterility.

Vol. 7, No. 3, *March*, 1924.

A chemical study of the inorganic constituents of blood in normal and abnormal pregnancy. DENIS, W., and KING, E. L.

The college—the hospital—the medical student. DICKINSON, G. K.

Summary of the answers to the questionnaire submitted to the members of the New York Obstetrical Society on the "Regulation of conception."

Diverticula and diverticulitis. LYNCH, JEROME M.

A study of three hundred cases, private patients, six weeks or longer post-partum; with reference to the condition of the pelvic floor, cervix and fundus. LANKFORD, BURNLEY.

Septic infections following childbirth, or an analysis of maternity mortality considered from the standpoint of increase of death among mothers. VAN DERVEER, EDGAR A.

Duplex uterus with multiple pregnancy; report of cases. BAINBRIDGE, W. S.

*Fulguration of Hunner ulcers. FURNISS, H. D.

Report of a case of carcinoma of base of appendix. TATE, M. A.

Maternal morbidity and mortality in the United States. MOSHER, G. C.

The renaissance of abdominal surgery; the passing of the gynæcologist. DEAVER, J. B.

The significance of ocular changes occurring in association with pre-eclamptic symptoms. MILLS, L.

*Uterine secretion, a brief investigation of its nature in the human being. KROSS, I.

Maternal and infant welfare without Government bureaucracy. CHAPMAN, W. D.

A hydrostatic bag for the induction of labour. LEE, G. H.

COLLECTIVE REVIEW, The Kielland forceps. GREENHILL, J. P.

SELECTED ABSTRACTS. Anæsthesia in obstetrics and gynæcology.

Blood sedimentation test as an aid in diagnosis in surgical infections. This test depends upon the time taken for the red cells to separate from the plasma in citrated blood. The normal time is about ten hours, but in sepsis and in pregnancy it is much less. The author believes that the explanation of this phenomenon is dependent upon certain changes in the electrical potential of the red cells. The technique is simple and requires no more facilities than are necessary for an ordinary blood-count. The author finds that it is specially useful in cases of adnexial disease in which there is latent infection with normal temperature and white cell-count. Operation upon such cases has often resulted in a flare-up of the infection which has jeopardized the life of the patient. He now delays operation until the sedimentation test indicates a sterile field. He is also of opinion that the test is valuable in the diagnosis of pregnancy after the fourth month and in some cases of unruptured tubal gestation, but is of no value in the differential diagnosis between a ruptured tubal pregnancy and tubal inflammation.

The time for operation in ectopic gestation. The systolic blood pressure tends to rise after the initial shock, and operation should be delayed until the reading has risen to 115. A continuous fall, or a rise followed by a fall, demands immediate operation. A rise above 120 may cause a "blow-out" of the clot which seals the rupture in the tube.

The use of X-ray therapy in disturbed menstruation. Rongy believes in the use of stimulating doses of X-ray therapy in patients who suffer from menstrual irregularities caused by ovarian disfunction. About one-third of his cases showed some improvement under this treatment and he regards these results as encouraging.

Lesions of the cervical stump of a supravaginally ablated cervix. During the past year Reder has met with cervical stump lesions demanding removal after the uterus had been removed for myomata in three cases. In two the stump had become carcinomatous in women of 58 and 62 years of age respectively. The hysterectomy was performed eight years ago in the former and seventeen years ago in the latter. In the third case a myoma, the size of a billiard ball, grew in the cervix three years after sub-total hysterectomy for multiple fibroids.

The author doubts whether total hysterectomy will ever meet with general approval in myomata provided that the cervix is apparently healthy. He bases this opinion not only upon the greater mortality and morbidity after the total operation, but also upon the increased liability to prolapse and the shortening of the vagina.

He, however, advises panhysterectomy if there is a family history of carcinoma or if, in young women, the cervix is badly lacerated. On the other hand he considers that supravaginal amputation is the operation of choice in myomatous virgin uteri, and that this can often be successfully combined with vaginal repair of the cervix in other cases whereby the advantages of the simpler operation are retained without the dangers.

In the discussion which followed Polak referred to 267 cases of carcinoma arising in the stump of the cervix after hysterectomy which he had collected from American literature.

Fulguration of Hunner ulcers. Furniss has successfully treated Hunner ulcers of the bladder by fulguration. Any type of operating cystoscope may be used, but he prefers the Kelly pattern. The results are " most gratifying " in many cases, and in the rest temporary relief can be counted upon which is more than can be said for other forms of treatment.

Uterine secretion: a brief investigation of its nature in the human being. In a recent publication the author showed that the uterine secretion of the rat had not only the power of delaying the coagulation of blood, but that the clot, when formed, was subsequently dissolved. He has recently had the opportunity of carrying out a few experiments of the same nature with hæmatocolpos fluid which have supplied additional support to the theory of the presence of a thrombolysin in menstrual blood which is secreted by the endometrium. His observations are therefore in accord with those of Beckwith Whitehouse upon this subject. W. W. KING.

The Journal of the American Medical Association.

Vol. 81, No. 23, *December* 8, 1923

*Urology in women. STEVENS, W. E.
An improved delivery sheet. THOMPSON, W. B.
*Acidified whole milk as a routine infant food. MARRIOTT, W. McK., and DAVIDSON, L. T.
*The transmission of arsenic from mother to fœtus. UNDERHILL, F. P., and AMATRUDA, F. G.

Vol. 81, No. 25, *December* 22, 1923.

Insulin in diabetic coma, complicating pregnancy. REVENO, W. S.

Vol. 81, No. 26, *December* 29, 1923.

*Mongolian idiocy in both twins. STRAUCH, A.

Vol. 82, No. 2, *January* 12, 1924.

*Low cervical Cæsarean section. HIRST, J. C., and VAN DOLSEN, W. W.
*Extra-uterine pregnancy at full term. CATLIN, J. J.

Vol. 82, No. 4, *January* 26, 1924.

*Non-protein nitrogenous constituents of the blood in eclampsia and allied conditions. PLASS, E. D.
*The case against axis-traction forceps. HIRST, J. C.
An unusual cyst. GUELEY, P. E. N.
The complemental feeding of the new-born. (Editorial.)

Vol. 82, No. 5, *February* 2, 1924.

*Induction of labour: indications and methods. DRUSKIN, S. J.
*The pernicious or hæmolytic anæmia of pregnancy. ROWLAND, O. C.
Pernicious vomiting in pregnancy. (Editorial.)
Intracranial birth hæmorrhages. (Current Comment.)
The origin of certain cystadenomas of the ovary. (Current Comment.)

Vol. 82, No. 7, *February* 16 1924.

*Observations on capillary microscopy in pregnancy. BAER, J. L., and REIS, R. A.

The diagnosis of pregnancy. MILNOR, E. C., and FENNEL, E. A.
A case of bilateral tubal pregnancy. PAYNE, W. H.

Vol. 82, No. 8, *February* 23, 1924.

*Value of diagnostic excisions and diagnostic curettage in gynæcology. FRANK, R. T.
*Suprarenal hæmorrhage in the new-born. CORCORAN, W. J., and STRAUSS, A. A.

Urology in women. Stevens considers that pathological conditions of the female urinary tract should be treated by the urologist. Strictures of the female urethra are not uncommon, and they are often responsible for functional and organic disturbances in the genito-urinary tract, whilst ureteral strictures are not as common as many believe. The most important etiological factor in pyelitis in pregnancy is pressure on the ureters by the enlarged uterus. Drainage and lavage of the renal pelvis through ureteral catheters is the treatment of choice in pyelitis of pregnancy. In unilateral renal tuberculosis during pregnancy the affected kidney should be removed as soon as the diagnosis is made.

Modern urological procedures, such as cystoscopy, ureteral catheterization, pyelo-ureterography and pelvic lavage, should be used in the diagnosis and treatment of pathological conditions of the urinary tract in infants and children.

Acidified whole milk as a routine infant food. Marriott and Davidson have obtained good results by feeding infants with whole cow's milk artificially soured either by inoculation with lactic acid producing organisms or by the addition of lactic acid. Theoretical explanations are given showing how cow's milk can be rendered more digestible by the addition of acid, so that it can be given in considerably larger amount. They admit that apart from any theoretical conditions involved, the only real test of the value of any method of infant feeding is the behaviour of the infant receiving the food. More than 1,000 infants in St. Louis have been fed on the formulas described, and the results have been so generally satisfactory that a still wider use of the method is to be recommended.

The transmission of arsenic from mother to fœtus. Underhill and Amatruda find that arsenic can be detected in small traces in the fœtal tissues after intravenous injection of the mother with neo-arsphenamin. The amount of arsenic recovered from the fœtal tissues does not increase in proportion to the number of serial injections given. Arsenic is also stored in the maternal liver and placenta, the amount increasing with the number of injections.

The explanation offered for the efficiency of ante-natal treatment of syphilis, especially on the new-born, is that the spirocheticide acts in greater concentration and more directly on the spirochætes in the placenta.

Mongolian idiocy in both twins. Strauch records a case in which mongolian idiocy occurred in both twins, the first-born children of young healthy parents. The occurrence of the mongolian idiot with a normal twin has been observed only in double ovum twins. Mongolism in both twins has been described only in twins of the sex, presumably single ovum twins. The conception of mongolism being due to an endogenic factor seems to find support in these observations.

The place of the low cervical Cæsarean section. Hirst and van Dolsen suggest the term " low cervical Cæsarean section " in place of the old name for the extraperitoneal operation. They describe and recommend the technique of Beck, slightly modified, and discuss its complications, after-treatment, advantages and disadvantages. Of 282 Cæsarean sections performed by the authors, 107 were done by the method described. They conclude that this operation has a very distinct and valuable niche in obstetric practice. In the case for which it is indicated, it avoids an unnecessary and unjustifiable risk of peritonitis, and secures the delivery of a living child with fewer post-operative complications and a better end-result than any other form of delivery possible in the circumstances.

Extra-uterine pregnancy at full term. Catlin records a case of extra-uterine pregnancy at full term which shows the following unusual features :— (1) The absence of menstrual flow throughout the pregnancy; (2) distinctness with which the fœtal sounds could be heard; (3) sprawled-out appearance of the child, as shown by Roentgen-ray; (4) rapid recovery with no absorption symptoms by means of wide open drainage; (5) complete and strong healing of the abdominal wound with no suturing, and (6) slowness with which the circulation through the placenta was cut off, it being forty-three days from the death of the child until all blood vessels were closed and the circulation in the placenta shut off.

Non-protein nitrogenous constituents of the blood in eclampsia and allied conditions. Plass found that the values of non-protein nitrogen, urea and uric acid in the blood plasma of normal pregnant women tend to fall in the lower range of normal, and this is particularly true of the urea, in which exceptionally low concentrations are occasionally manifest, while the opposite tendency is sometimes apparent in the uric acid values at the other end of labour.

There are no characteristic changes in the concentrations of these substances during the toxæmias of pregnancy, whether they are associated with convulsions or not. In many instances the serum or plasma findings are normal, whilst in other cases there is a moderate increase, which is more likely to affect the uric acid values, so that a moderate rise in the concentration of this nitrogenous end-product is common, but not invariable. Cases of clinical nephritis fail to show any variation which may be regarded as pathognomonic. It seems, therefore, that chemical examination of the blood for these constituents is useless as an index of the severity of the pathological changes in eclampsia and its associated toxæmias.

The case against axis traction forceps. Hirst enumerates and describes a long list of injuries and harmful after-effects both to mother and child after the use of axis-traction forceps. He discusses alternative methods of delivery, and concludes that a low cervical Cæsarean section will secure delivery with a maximum of safety to both mother and child. He believes that this is a much safer procedure than an axis-traction delivery requiring the usual amount of force whilst there is much less risk of sepsis, none of hæmorrhage, and the child is never uselessly mutilated, and it does not prejudice subsequent normal delivery, provided the patient's measurements permit it.

Induction of labour. Druskin contends that: (1) Induction of labour is a well-recognized procedure, (2) its place in obstetrics is well defined, (3) it is a justified procedure at any stage of pregnancy when the health or life of the mother is endangered, (4) it should never be attempted before the thirty-sixth week, (5) it compares favourably with Cæsarean section, (6) the metreurynter or bag is the method of choice, (7) it is a safe and simple procedure. He prefers a bag made of animal membrane filled with a solution either of magnesium sulphate or of glycerine.

The pernicious or hæmolytic anæmia of pregnancy. Rowland thus summarizes his views:—

(1) The hæmolytic anæmia of pregnancy closely resembles pernicious anæmia; and although the primary mortality is high, the anæmia once overcome does not recur.

(2) The anæmia comes on insidiously, and may become apparent during the later months of pregnancy or during the puerperium.

(3) Labour is apt to come on prematurely and is characteristically short, relatively painless and with a minimum of bleeding. Stillbirths in neglected cases are frequent, and there may be sudden collapse and death of the mother after parturition.

(4) Transfusion and arsenical treatment should be carried out vigorously to tide the patient over the critical period.

(5) All toxic pregnant patients should be examined for anæmia.

(6) The condition should be more widely known especially among obstetricians, so that an early diagnosis may be made and preventive treatment carried out.

Observations on capillary microscopy in pregnancy. Baer and Reis consider that capillary microscopy, especially when associated with methylene blue and "freshet tests," gives us another method that should prove of value in the differential diagnosis of the kidney of pregnancy and true nephritis complicating pregnancy.

The value of diagnostic excisions and diagnostic curettage in gynæcology. Many leading physicians have repeatedly stated that diagnostic excisions and diagnostic curettages are dangerous because they tend to spread cancer cells. Frank believes that clinical experience does not bear this out, and that the small and almost hypothetical danger incident to diagnostic excision and exploratory curettage in gynæcology is far outweighed by the frequent and positive benefits that accrue to patients who are saved from unnecessary radicalism.

Suprarenal hæmorrhage in the new-born. Medical literature records about one hundred cases of extensive suprarenal hæmorrhage in the new-born, but the authors appear to have recorded the first case upon which operation was performed, with recovery. The character of the hæmatoma with its central firm thrombus lead them to assume that a vascular lesion of the suprarenal gland occurred during the hard pains of the first stage of labour. The infant was very large, and the intensity of the uterine contractions was sufficient to cause considerable pressure on the body of the fœtus and on the friable suprarenal gland. The manipulation following the precipitate delivery may have intensified the hæmorrhage. F. E. T.

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*The relation of the endometrium to ovarian function. NORRIS, C. C., and VOGT, M.

*Gangrene of the extremities complicating puerperal sepsis. CHESKY, V. E.

*Experience with one thousand cases of abortion. HILLIS, D. S.

*Hæmolytic streptococci and their relation to pregnancy and the puerperium. KANTER, A. E., and PILOT, I.

*The treatment of gonorrhœal endocervicitis by heat. CORBUS, B. C., and O'CONNOR, V. J.

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*Placenta accreta; its incidence, pathology and management. POLAK, J. O., and PHELAN, G. W.

*Intracranial hæmorrhage in the new-born. SHARPE, W., and MACLAIRE, A. S.

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Diabetes insipidus with acute retention in pregnancy; with report of a case. VICKERS, D. M.

*Lymphaticostomy in puerperal infection. EDWARDS, A. C.

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*Benign and malignant endometrial implants in the peritoneal cavity and their relation to certain ovarian tumours. SAMPSON, J. A.

*The indications and results of the interposition operation in the treatment of cystocele and prolapse of the uterus. MILLER, C. J.

*The effects of radium rays upon the ovary. MATTHEWS, H. B.

*Ovarian implantation; the preservation of ovarian function after operation for disease of the pelvic viscera. ESTES, W. L.

The relation of the endometrium to ovarian function. Norris and Vogt believe that the endometrium possesses a definite endocrinal function, which, like other endocrinal glands, acts in conjunction with the ductless glands, particularly the ovary, and that this endocrinal function fluctuates with the menstrual cycle, being most active during the premenstrual period.

They found evidence supporting this view in the fact that the proportion of women who suffer from nervous phenomena after hysterectomy with conservation of one or both ovaries is much greater than that of those who exhibit painful or palpable changes in the conserved ovary, and in patients who have been treated with radium for the arrest of benign hæmorrhages.

In operations on the uterus, ovarian conservation is of distinct value, even if panhysterectomy is performed; but the ovaries function better and have a longer functional life if a portion of the endometrium is preserved. The thickened and permanent premenstrual stage of the endometrium, so frequently present in myomatous uteri, is the result of stimulation of the endometrium by the presence of the tumour, and accounts for the prolonged bleeding that is often present.

Gangrene of the extremities complicating puerperal sepsis. In recording a case the author points out that puerperal peripheral gangrene, while not common, may occur in any case of puerperal sepsis or septic abortion. It is always preceded by infection. It is most frequently of arterial origin. The mortality is 50 per cent. or more. The most important step in the treatment is early amputation of the gangrenous part.

Experience with one thousand cases of abortion. Hillis's study of a thousand cases of abortion indicates that :—

(1) Conservative treatment of abortion, in febrile cases, gives better results than active therapy.

(2) Febrile patients who have a five-day afebrile period have a greater tendency to continue a normal temperature after curettage than those who are operated upon before the end of this period.

(3) Afebrile patients with a five-day observation period have a greater tendency to remain with a normal temperature than do those who are curetted before the end of this rest period.

(4) Approximately in 6.2 per cent. of patients the uterus must be emptied because of alarming hæmorrhage.

(5) A plan of procedure which embodies a conservative rest period of five days' normal temperature for febrile and afebrile patients, and which results in as low a mortality as that quoted in this paper seems to be a rational method for the treatment of abortion.

Hæmolytic streptococci and their relation to pregnancy and the puerperium. Kanter and Pilot found that the normal vagina rarely contains virulent hæmolytic streptococci, and there is no evidence that the presence of such streptococci plays any part in the production of puerperal sepsis. Any manipulation of the vagina, either for examination or operative procedure, increases the possibility of puerperal sepsis. Puerperal hæmolytic streptococcal infection is regarded in most instances as evidence of exogenous infection. Droplet infection from attendants is possible and the use of gauze masks during delivery and the exclusion of those having sore throat from the delivery room and from attendance on puerperal women is clearly indicated.

The treatment of gonorrhœal endocervicitis by heat. Based upon clinical evidence of complete cure covering a period of from two to four years' observation O'Connor found that the treatment of gonorrhœa localized in the cervical canal by means of heated electrodes was far more successful than any previously tried technique. To get an exact distribution of heat it is necessary accurately to control the temperature within the cervix. The method is painless and devoid of medication. Strictures and cicatrices are avoided.

Placenta accreta; its incidence, pathology and management. From a review of 6,000 deliveries occurring in the Long Island College Hospital studied to determine (*a*) the frequency with which placenta accreta is met; (*b*) the incidence of infection; (*c*) the method of treatment employed; and (*d*) the complications that occurred, including the mortality, the authors draw the following conclusions :—

(1) The incidence of placenta accreta is about 1 in 6,000 cases.

(2) There is considerable confusion between simple adhesion of the placenta and true accreta.

(3) Accreta is a definite pathological entity.

(4) Manual removal is impossible and can only result in hæmorrhage, sepsis or perforation.

(5) Every delayed placenta with no hæmorrhage should be viewed with suspicion; and no attempts at Crédé's method should be made if the clinical signs of separation are not present.

(6) In the presence of an attached placenta without bleeding, aseptic exploration under anæsthesia should be made to determine the subsequent procedure.

(7) If no line of cleavage can be demonstrated, hysterectomy should be done.

Intracranial hæmorrhage in the new-born. In the authors' series of 100 consecutive deliveries there was only one case clinically diagnosed as hæmorrhagic disease of the new-born. They then investigated a second series of 100 cases to determine, if possible, what percentage of new-born babies sustain intracranial hæmorrhage and cerebral œdema, with or without signs, and whether a routine method could be adopted whereby cerebral vascular injury without signs could be detected early. Routine lumbar puncture was performed on the second 100 consecutive new-born babies, ranging in age from nine minutes to 100 hours. The authors' conclusions are as follows :—

(1) Intracranial hæmorrhage of the new-born occurs more often than was formerly suspected.

(2) Death results from extensive intracranial hæmorrhages and cerebral œdema unless the hæmorrhage can be entirely absorbed by the natural means without any resultant organization residue; the unrecognized and therefore improperly treated cases of the milder degree of intracranial hæmorrhage develop in a large percentage later some form of cerebral spastic paralysis with or without mental impairment.

(3) Cerebral spastic paralysis due to intracranial hæmorrhage should be differentiated from Little's disease—the latter including only those cases due to cerebral agenesis and meningo-encephalitis.

(4) Pediatricians neurologists and neuro-surgeons usually see the cases late as chronic conditions when spastic paralysis in its various forms has already developed, and when the condition at best can only be improved, whereas it is the obstetrician who sees these cases in the acute stage.

(5) The acute cases with mild signs or no recognized signs at all are overlooked.

(6) A study was undertaken to detect apparently signless intracranial hæmorrhage in the new-born with the result that 13 per cent. of 100 deliveries at the City Hospital were discovered as having an intracranial hæmorrhage of varying degree by routine lumbar puncture within the first 24 to 48 hours after birth.

(7) Low forceps and syphilis were not found to be important factors in the causation of intracranial hæmorrhage at birth.

(8) Lessened coagulability of the blood does not appear to be an important and frequent factor in intracranial hæmorrhage of the new-born—the clotting time not being lengthened in any of the cases in this series within 48 hours after birth.

(9) Lumbar puncture as a diagnostic and therapeutic measure has proven to be a safe procedure in this series in the absence of shock.

(10) Apparent signs indicative of an acute intracranial hæmorrhage and cerebral œdema can be confirmed or disproven by early lumbar puncture and the resulting intracranial pressure estimated with the spinal mercurial manometer, and in doubtful cases the appropriate treatment instituted early.

(11) Lumbar puncture is advocated as a safe routine procedure in suspected cases having the mildest signs of intracranial hæmorrhage and

cerebral œdema within 72 hours after birth and is a valuable aid to the natural means of absorption.

(12) Repeated spinal drainage by means of lumbar puncture at intervals of 6 to 24 hours is advocated in cases of bloody spinal fluid under varying degrees of pressure.

(13) If repeated lumbar drainage fails to diminish progressively the blood concentration and the pressure of the cerebro-spinal fluid, then a modified subtemporal decompression and cranial drainage is indicated.

(14) The fact that an intracranial hæmorrhage occurred in 9 per cent. in the first series of 100 consecutive deliveries and in 13 per cent. in the second series of 100 would tend to indicate a more frequent intracranial lesion at the time of birth than ever conceived.

Lymphaticostomy in puerperal infection. Edwards records a case of puerperal infection successfully treated by opening and draining the thoracic duct after the method of Costain. He points out that the recovery of the same type of organism from both the cervical canal and thoracic fluid proves that a great deal of absorption takes place through the lymphatic system. He considers that lymphaticostomy is a relatively harmless procedure, and that drainage of the thoracic duct relieves the toxæmia and in conjunction with other measures is a useful adjunct in the treatment by the systemic type of puerperal sepsis.

Benign and malignant endometrial implants in the peritoneal cavity and their relation to certain ovarian tumours. Sampson considers that the implantation of benign endometrial tissue upon the surface of the various structures in the pelvis is of common occurrence, having observed it in 64 of 296 abdominal operations for pelvic conditions in one year.

The implants, wherever situated, may invade the underlying tissue on which they develop, spread over the surface of the same, or invade other structures in contact with them. In their reaction to menstruation, epithelium may be cast off and give rise to other or secondary implants.

The peritoneal implants are usually small, slow growing and insignificant, but occasionally spread and become invasive.

The ovarian implants are frequently much more active than the peritoneal, suggesting that the ovary is generally their most "fertile soil." They often develop into superficial or deep menstruating ovarian cysts. The superficial cysts are small, but the deeper ones are often of much larger size. These endometrial cysts or hæmatomata often perforate, and their contents, carrying epithelium cast off by menstruation, escape into the peritoneal cavity. Secondary implantations may arise from these perforations.

These implants and the endometrial structures arising from them react to menstruation, pregnancy, and the menopause (natural, or surgical), in the same way as does the uterine mucosa. Hence malignant ovarian tumours may arise in these benign endometrial structures in the ovary and in the benign peritoneal implants. It remains to be determined to what extent the implantation of uterine and tubal tissue on the ovary is responsible for the development of ovarian tumours other than typical menstruating endometrial cysts.

Bits of malignant tissue, from malignant endometrial tumours, also at times escape from the uterine cavity through the tubes and give rise to peritoneal and ovarian implants, which may develop into malignant tumours.

Curettage and manipulation of the uterus may force blood containing bits of endometrial tissue through the tubes into the peritoneal cavity. Should such escaping tissue be malignant, the patient may die from a so-called recurrence of cancer, even though the primary growth be subsequently destroyed by radium or the uterus be removed.

Bearing in mind the readiness with which endometrial tissue may become implanted and grow in the tissues of the pelvis, and the avenues and the means by which it may escape from the uterus, it is of the greatest importance to attempt to prevent this implantation in the diagnosis and treatment of cancer by the body of the uterus.

Sampson deems it advisable to lay down the following rules in the treatment of this disease :—

(1) A patient in whom cancer of the body of the uterus is suspected should be examined with great care and gentleness.

(2) The diagnostic curettage should be employed only in doubtful cases or poor operative risks, and if used should be done very gently.

(3) Radium should not be used, as the insertion of the capsule containing the radium acts as the plunger of a piston syringe, forcing contents of the uterine cavity into the tubes.

(4) Abdominal hysterectomy with the least possible manipulation of the uterus, and the closure of the channels through which material may escape from the uterus into the field of operation, offer the best chance for a permanent cure. The fimbriated ends of the Fallopian tubes should be first ligated; the ovarian vessels, round ligaments, and uterine vessels should be doubly ligated, cutting between the ligatures; the vagina should be clamped below the cervix and carefully cleansed before severing the vagina below the clamp and removing the uterus.

The indications and results of the interposition operation in the treatment of cystocele and prolapse of the uterus. Miller points out that the cardinal principles upon which the Watkins' operation of interposition is based are : (1) The bladder rests upon, and is supported by, the posterior wall of the uterus; (2) the uterus is elevated in the pelvis by being tipped forward, its position being changed about 180 degrees; (3) the twist produced in the broad ligaments by the change in the position of the uterus perceptibly shortens them, and is the chief factor in correcting the uterine prolapse; and (4) the tendencies of the uterus and bladder are antagonistic to further prolapse, as they work against each other to hold the correct position.

In view of the excellent results obtained, ranging from 90 to 98 per cent. of cures, it may be concluded that the interposition operation, combined with the correctly applied principles of plastic surgery of the pelvic floor, will result in a higher percentage of satisfactory results than any other operation so far devised for the relief of uterine prolapse and the associated cystocele.

The effects of radium rays upon the ovary. From an extensive experimental, pathological and clinical study of the effects of radium rays upon the ovary Matthews considers the following conclusions may be formulated :

(1) Ovarian tissue in certain of the lower vertebrate animals, notably the rabbit, can withstand relatively larger " doses " of radium rays than those of the human without loss of fecundity. This can be accounted for in at least two ways : (*a*) By the so-called " selective " action of the radium rays; (*b*) By the fact that the ovaries in the lower vertebrate animals lie

near the abdominal wall, and are, therefore, easily irradiated from without the body, whereas in the human the radium is usually placed within the uterus, and it thereby exerts an effect upon the endometrium, so that finally there is a dual effect of the radium.

(2) Rabbit ovaries show no characteristic pathological changes from the action of radium rays up to 800 milligram-hours. Beyond this amount the changes depend on the " dose " administered, the character of the screen employed, and the distance from the source of radiation.

(3) The main histo-pathological changes in human ovaries from exposure to radium rays in sufficient " dosage " to produce amenorrhœa for periods of 800 to 1200 milligram-hours or more, is a round-celled infiltration, engorgement of the blood-vessels, and an extensive fibrosis in and about them and throughout the entire organ, with more or less disintegration of the follicular apparatus. These changes are increased proportionately with an increase in the " dose " administered, so that finally there is complete destruction of all the follicles (ripe and unripe) with extensive fibrosis throughout the entire organ, amounting, in many of the blood vessels, to obliterative endometritis.

(4) After the usual dose of radium used to regulate non-malignant uterine bleeding pregnancy may occur and delivery may be normal. If more than 600 to 800 milligram-hours or this equivalent be used, fertility, in all probability, will be destroyed.

(5) The tendency to abortion is slightly more common following the use of radium.

(6) The offspring of previously irradiated human subjects show no untoward effects and usually develop normally. Occasionally they are somewhat below normal in physical development, but this cannot be attributed entirely to the effects of the radium.

(7) Age appears to be a very important factor as regards irradiation effects. The ovaries of active healthy young animals can withstand relatively much larger non-sterilizing " doses " of radium than the ovaries of older, less active, animals.

(8) A universal standardized method of expressing radium doses is highly desirable.

(9) The employment of radium irradiation in affections of the female reproductive system should remain in the hands of those gynæcologists and obstetricians who have had special training in radium therapy, for the indiscriminate use of such a valuable therapeutic agent can reflect only to our discredit.

Ovarian implantation. In an attempt to preserve ovarian function after operation for disease of the pelvic viscera Estes describes an operation for implantation of an ovary upon the horn of the uterus which may be followed by menstruation, which is usually normal in character, and pregnancy may follow. There may be pain in and about the implanted ovary, or rarely the ovary may become cystic and require subsequent removal.

Tuffier's well-known work on " Transplantation " has, since 1910, rather dominated the field, as the preservation of menstruation seems of more vital importance than the possibility of pregnancy. The author, however, desires to direct attention to the possibilities of conservative ovarian implantation, and the opportunity it affords for permitting pregnancy as well as maintaining menstruation. F. E. T.

La Gynécologie.

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*The ovary and the neuroglandular system. LEYNEN, F.

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*Operations for retroversion of the uterus. HENNEBERG, H.

*Treatment of pregnancy in tuberculous women. VORON, M.

Treatment of pregnancy in tuberculous women. WEYMEERSCH and ALBRECHTS.

*Methods of anæsthesia during labour. RAPIN, O. J.

*Methods of anæsthesia in gynæcology. SCHICKELE.

*Clinical study of the relations of the appendix with the female genital organs. BEUTTNER, O.

*Pubiotomy: results obtained at Lausanne. THELIN, CH.

*A case of true hermaphroditism. REVERDIN, A.

November, 1923.

*Indications for blood transfusion. DUPUY DE FRENELLE.

December, 1923.

*Hæmorrhage in tertiary syphilis of the uterus. SEJOURNET, P.

January, 1924.

*Localized pelvic tuberculosis. VAUTRIN.

Reanimation of the heart by intra-cardiac injection of adrenalin. ROULLAND, H.

February, 1924.

*The treatment of generalized puerperal sepsis. DE SAINTE-BLAISE, G. B., and JOANNY, J.

March, 1924.

*The cure at Salies-de-Béarn in gynæcological affections. DOLERIS, A.

*The development of ovarian cysts in the other ovary after ovariotomy. MOURGUE-MOLINES, E., and GUIBAL, A.

The ovary and the neuroglandular system. A brief account of the involuntary nervous system is given, and the antagonism of the true sympathetic and para-sympathetic systems is pointed out. Equilibrium is maintained by the glands of internal secretion. The ovary regulates the whole system, acting on the sympathetics through the intermediary of the endocrine glands.

The ovary is very sensitive to physical influences (such as infectious diseases) and to psychical shocks. The earlier the time of action of these noxious influences, the more serious the consequences. At puberty, the result is delayed by onset of menstruation. In adult life the ovarian potential is the result of all previous influences, organic or otherwise: its activity may be reduced. It may fall to nil; that is uterine sclerosis.

Three cases of premature menopause are described. In each there was a history of acute infectious disease during the period of development; and in each the amenorrhœa followed a prolonged lactation.

1. Age 33, ii-para. Lactation 16 months. Typhoid at 18.
2. Age 29, iii-para. Lactation 13 months. Croup at 9; scarlatina at 13.
3. Age 31, i-para. Lactation 14 months. Diphtheria at 8.

The treatment was hypodermic injections of total ovarian extract every other day for a month, then bi-weekly for another month. After a month's rest oral administration was continued for two months more. There was a

striking improvement in the general condition and gain in weight (7½, 9 and 10 kilos.). The second patient recommenced to menstruate.

Operations for retroversion of the uterus. In this discussion there was considerable difference of opinion as to the necessity for operative treatment in cases of *mobile* retroversion. Some advocated operation in the presence of dysmenorrhœa, menorrhagia, sterility or repeated abortion. The procedures favoured were extra- and intra-peritoneal shortening of the round ligaments.

Operation is more clearly indicated for *fixed* retroversion, but here it is often necessary to deal with diseased appendages as well as to correct the position of the uterus.

Treatment of pregnancy in tuberculous women. Tuberculosis causes diminished fecundity; but if pregnancy occurs its course is little influenced.

The prospects for the children are very bad if they remain in the family surroundings, but excellent if they are removed to healthy conditions. Among 23,000 children of the Granchy Society only seven cases of tuberculosis occurred, and only one death from tuberculosis occurred among 2,450 children of the Brussels Society for the Preservation of Children. From these figures it is concluded that familial contagion is the principal factor, and heredity is only a secondary consideration.

The influence of pregnancy on tuberculosis is usually unfavourable, especially just after delivery. This is the result of a general diminution of resistance in the parturient.

Interruption of pregnancy is beneficial in selected cases. It is not justified in cases of very slight disease, nor in advanced cases in which there is no prospect of cure or improvement. It should not be done later than the third or fourth month, since a premature labour entails the same risk of exacerbation as delivery at term. Some sterilize the patient as well, by ligature of the tubes, hysterectomy, or X-rays.

Lactation should be absolutely forbidden, in the interests of both mother and child.

Methods of anæsthesia during labour. The following conclusions are drawn:

1. It is legitimate to try to diminish or suppress the pain of child-bearing on condition that the methods employed harm neither mother nor child.

2. Applied with moderation and discernment, anæsthetics can relieve the mother of the fear, apprehension and nervous shock which certain women manifest or save up for a future accouchement. They are thus an agent in the struggle against one of the numerous causes of depopulation. They simplify a painful and exhausting labour, and in some cases they save the life of the child.

3. There is no single ideal method applicable in every case.

4. Suggestion, alone or combined with other methods, may be considered free from danger.

5. Equally without danger, the methods which solace the general condition, reduce general sensibility and cerebral excitability by medicaments giving rest and quiet between the pains, being used in doses far removed from toxic doses.

6. The pains of labour being discontinuous, it is necessary to use a discontinuous procedure, preferably a volatile anæsthetic, non-toxic and rapidly eliminated.

7. Rules can be laid down only for the guidance of students, and to serve as a basis for a perfected individual technique.

8. According to the case and the circumstances the doctor will make use of one of the available methods. He will be influenced by his experience in this domain and his personal preference, and he will use the simplest procedures, always remembering that with anæsthetics it is better to err by excess of modesty rather than by excess of boldness.

Methods of anæsthesia in gynæcology. This discussion followed familiar lines, but one gains the impression that spinal anæsthesia and local anæsthesia are employed more commonly in France than in this country.

Clinical study of the relations of the appendix with the female genital organs. Beuttner reports a new series of 500 laparotomies, in which he found the appendix normal in 314, altered in 69. The appendix was not examined in 121 cases. Appendectomy 27 times (5.3 per cent.). He concludes that routine removal of the appendix in gynæcological laparotomies is not to be recommended and that each case should be treated individually.

Pubiotomy: results obtained at Lausanne. Between 1907 and 1922 Prof. Rossier and his assistants performed 26 pubiotomies (Gigli's method). Two mothers and four children died. There were four cases of bladder injury, three vesico-vaginal fistulas, one phlegmasia alba dolens, two thrombo-phlebitis, one parametritis, one suppurating hæmatoma.

A case of true hermaphroditism. The patient, 30 years of age, had been educated and married as a male. The features and general development were of female type. External genital organs of a " child " of 10. A small orifice in front of the anus discharged a little blood each month. Swellings developed in the left inguinal canal and in the right side of the abdomen. At the operation a uterus was found. The left swelling was found to be an ectopic testicle containing bodies identical with corpora lutea. The right swelling was a tumour containing ovarian and testicular elements in juxtaposition.

Indications for blood transfusion. In order to avoid the risk of losing a patient for lack of a transfusion of blood this must be done in cases in which it does not appear to be absolutely indispensable.

Whenever a patient causes uneasiness after an operation, the necessity of a transfusion should be discussed.

Before an operation, whenever there is any apprehension of insufficient resistance to shock, one should reflect on the increased resistance conferred by one or several preparatory transfusions.

Whenever there is a risk of great loss of blood in the course of an operation one should think of transfusion.

In sudden violent hæmorrhages, such as are common in obstetrical cases, if the red corpuscles fall below four millions per cmm. within the first four hours, the condition is almost certainly fatal except for transfusion.

In cases where there has been long-continued loss of blood, if the red corpuscles are below two millions or if the hæmoglobin is less than 35 per cent., no operation must be undertaken without preliminary transfusion. Crile performs transfusion whenever the hæmoglobin is less than 75 per cent. before an operation.

In grave infections not complicated by hæmorrhage, transfusion has given few successes.

Hæmorrhage in tertiary syphilis of the uterus. Five clinical groups are described :—

(1) *Primitive syphilitic hæmorrhage.* Here there is a sudden more or less profuse loss of blood, occurring in patients who have previously menstruated normally. This has sometimes proved fatal.

(2) *Syphilitic menorrhagia*—a gradual increase in the duration and profusion of the menstrual loss. Curettage gives only temporary relief. The infection may be either acquired or congenital.

(3) *Syphilitic metrorrhagia.* This usually, but not invariably, developes out of a condition of menorrhagia. It may lead to grave anæmia. It resists all medical treatment (non-specific) and curettage.

(4) *Post-partum syphilitic hæmorrhage.* This follows labour or, more usually, abortion. It may follow directly or after an interval of months. It is not cured by curettage, but is cured by specific treatment.

(5) *Syphilitic hæmorrhage after the menopause.* This may occur many years after the cessation of menstruation. There are irregular blood-stained discharges, sometimes offensive and associated with leucorrhœa. Exploration of the interior of the uterus serves to exclude carcinoma of the body.

The question of the syphilitic nature of hæmorrhage will seldom arise when gross changes can be recognized in the uterus; but when there is no definite lesion and curettage gives a negative result syphilis has to be considered. When this is the cause appropriate treatment will give brilliant results.

Localized pelvic tuberculosis. This is a comprehensive account of tuberculosis as it affects the uterine appendages. It is described under the following headings: tuberculous salpingitis, pyosalpinx and hydrosalpinx; and primary tuberculosis of the ovary. Medical and hygienic treatment, particularly heliotherapy, are valuable, but they frequently fail.

Operative treatment may be (1) simple laparotomy, which is stated to be followed by a considerable proportion of cures; (2) conservative operations on the appendages; or (3) radical operation including removal of the uterus. The author has performed conservative operations in 24 cases, with only one recurrence; and one of the patients, subsequently to a bilateral partial salpingectomy, became pregnant. The conservative method is applicable only when the disease is limited to the ampullary portions of the tubes, the isthmic portions being healthy. Tuberculous pyosalpinx and hydrosalpinx and primary ovarian tuberculosis are often unilateral, and can be treated by removal of the appendages on one side. If the tubes are diseased in their entire length it is certain that the uterus will be involved, and the radical operation is necessary.

The treatment of generalized puerperal sepsis At the Maternité de Saint Antoine, in addition to local treatment when this has been indicated, intravenous injections of arseno-benzol have been given, in doses of 0.10 gramme on alternate days. Statistics are given showing that since this treatment has been used the mortality of puerperal infections, instead of being 4 to 8 per cent., has fallen to 0.5 per cent. (1 death in the last 198 cases).

It is not decided whether the action is a general tonic effect of the arsenic

compound, or whether it is a bactericidal action. Allison is quoted as showing that virulent streptococci are killed *in vitro* by arseno-benzol in a dilution of 1 in 3,000, but this proportion is of course enormously greater than any that will be attained *in vivo*. A smaller concentration may have an inhibitory effect on the streptococci.

The cure at Salies-de-Béarn in gynæcological affections. This address, by the President of the French Academy of Medicine, is an exposition of the rationale of balneological treatment, and a plea for its more extensive use in gynæcological disorders.

After taking into consideration the chemical, thermal and mechanical factors, radio-activity, change of air, soil, altitude and climate, he is forced to the conclusion that something mysterious remains [? suggestion].

The Salies-de-Béarn treatment is said to improve the tone of non-striped muscle in the arteries, veins, uterus and supporting ligaments; and also to assist the resolution of inflammatory exudates. Good results are claimed in the following affections :—

1. *Amenorrhœa,* whether of uterine or ovarian origin.
2. *Dysmenorrhœa* and *pelvic congestion.*
3. *Menorrhagias* due to venous derangements, the result of constitutional taint—syphilis, tuberculosis or alcoholism.
4. *Displacements* due to a relaxed state of the supporting structures; but no benefit is to be expected when they are due to obstetrical traumatism.
5. *Metritis* due to microbic infection; and *false metritis*—not the result of infection but a sclerosis due to some constitutional state. Even when there is an infective cause a morbid constitution leads to chronicity.
6. *Parametritis, perimetritis* and *salpingitis.*
7. *Myoma.* The treatment is said to control the hæmorrhage, and even to cause a diminution in the volume of the tumour.
8. *Genital tuberculosis.*

The development of ovarian cysts in the other ovary after ovariotomy. The authors have collected from the literature 75 cases, but they recognize that many others have not been placed on record. They estimate that after an unilateral ovariotomy the remaining ovary becomes cystic in 4 per cent.; the mean interval being 22 months in malignant cases, and 75 months in simple cases. Usually the second cyst reproduces the nature of the first, but occasionally the type is more malignant.

The following explanations have been suggested :—(1) The lesion is from the first bilateral; but at the time when one tumour has reached a size necessitating operation, the other is still microscopical. (2) The second is a metastasis from the first. (3) The second is the result of a graft. (4) Both are the result of a symmetrical dystrophia which produces its effects at different times.

In dealing with such a case it should be remembered that the second tumour may be more malignant than the first; and that the second operation is likely to be more difficult and dangerous on account of adhesions.

In performing an ovariotomy the second ovary should be removed (1) if the patient is over 40; (2) if the second ovary shows evident lesions, whether a true cyst or extensive sclero-cystic degeneration; or (3) if the cyst removed has malignant characters—gelatinous and papillomatous cysts being included in this group. The patient should be warned in advance that it may be necessary to remove the second ovary. A. Gough.

Bulletin de la Société d'Obstétrique et de Gynécologie de Paris, etc.

No. 4, *June* 11, 1923,

Two cases of cicatricial stenosis of the cervix : extraction of the fœtus per *vias naturales* in the first; Cæsarean hysterectomy in the second. GROSSE, M. A.

Two cases of cystic kidneys in the new-born. RISACHER, S. S.

Perforation of the uterus during induction of abortion : hæmatocele of the broad ligament : infection. Hæmorrhagic pleurisy. STAVRIDES, G.

*Discussion on the treatment of retained membranes. BOUFFE DE SAINT-BLAISE, METZGER, LE LORIER.

Discussion on the organization of an Obstetrical Radiological Clinic in Paris. LE LORIER and BOUCHACOURT.

A case of ruptured tubal gestation with co-existing uterine pregnancy. AUVRAY.

*Concerning some rare varieties of sarcoma of the uterus. AUVRAY.

REUNION OBSTETRICALE ET GYNECOLOGIQUE D'ALGER,

April 14, 1923.

A case of Cæsarean section. CABANES, POUGET and HOUEL.

*Prolonged aseptic retention of placenta. HOUEL.

A case of spontaneous evolution, lateral type. HOUEL and CAUVIERES.

Immediate reduction of cranial depressions in the newborn. POUGET and HOUEL.

Staphylococcal septicæmia after abortion. Death. FERRERE.

Post-partum eclamptic convulsions, without albuminuria. Treatment by morphia; polyuria; cure. FERRERE.

Cancer of the cervix in a complete genital prolapse. CONSTANTINI and MONTERO.

Pott's disease with paraplegia developing during pregnancy. LAFFONT, GAUJOUX and BOUVIER.

A case of hyperthyroidism during the puerperium. LAFFONT.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE LYON.

May 7, 1923.

Twenty-two conservative Cæsarean sections. GUILLERMIN, A.

Epithelioma of the cervix uteri resembling perithelioma. COTTE and MICHON.

*Myomectomy at the eighth month of pregnancy. PLAUCHU and GAUDON.

*Note on the etiology of puerperal infection. VORON, DURAND and SEDALLION.

Velamentous insertion of the cord visible in a five months' ovum expelled entire. PLAUCHU and GAUDON.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE NANCY.

April 18, 1923.

Myomectomy during pregnancy for a bleeding cervical fibroid. FRUHINSHOLZ and HAMANT.

Myomectomy and pregnancy. JOB and HAMANT.

Vesico-vaginal fistulæ after Wertheim's operation. ANDRE & GRANDINEAU.

Pernicious anæmia in pregnancy and blood transfusion. CHATON.

May 16, 1923.

Salpingitis, appendicitis and ectopic gestation, difficulties of diagnosis. MICHEL and MATHIEU.

Consequences of vascular anastomosis in uniovular twins. MUTEL and VERMELIN.

Normal pregnancy carried to term in contact with a placenta retained in the uterine cavity. FRUHINSHOLZ and MARIOT.

A typical form of pyelitis of pregnancy with pronounced nitrogen retention and cachexia; abortion induced. FRUHINSHOLZ and ANDRE.

Good result of hypophyseal extract. VERMELIN and MILOT.

Repeated pernicious anæmia of pregnancy, abortion induced. Maternal death. VERMELIN and VIGNEUL.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE STRASBOURG.

May 5, 1923.

Remarks on the mechanism of labour. SCHICKELE.

The rôle of the bag of fore-waters in labour. KREIS.

Non-rotation of the head during spontaneous labour. KELLER.

Rupture of the pelvic joints and its relation to natural labour. KELLER.

Concerning brow presentation. MARET.

On the deflexion of the head during labour. WOELZ.

Mechanism of labour in the oblique pelvis. BURGER.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE TOULOUSE.

February 2, 1923.

Multiple cysts of the vagina. DIEULAFE.

Subtotal hysterectomy in a case of physometra. AUDEBERT and FOURNIER.

Torsion of an ovarian cyst at the third month of pregnancy. LAURENTIE.

A severe case of premature separation of the normally situated placenta. LAURENTIE.

Congenital absence of the uterus. LAURENTIE.

Some modifications in the technique of epidural anæsthesia. AUDEBERT and BERNARDBEIG.

Two cases of epidural sacral anæsthesia for the application of difficult forceps. GARIPUY and BERNARDBEIG.

*Emergency Porro operation in the country, mother and child living. FOURNIER.

Double influenzal phlebitis. Thrombosis of vena cava and right renal vein. Cholecystitis syndrome. Convulsive uræmia; death. FOURNIER and GINESTY.

Treatment of post-abortum peritonitis by vaginal hysterectomy. TOURNEAUX.

Vesico-vaginal fistula following dystocia: operation per vaginam. Cure. FOURNIER and GAY.

*Conservative Cæsarean section 48 hours after the onset of labour and after forceps failure. GARIPUY.

Cæsarean section in a girl of 13 years of age. AUDEBERT.

Discussion on treatment of retained membranes. Bouffe de Saint-Blaise explored and curetted immediately in all cases of complete or partial retention in order to avoid the necessity of exploration, etc., later, in the presence of developed infection.

Metzer, basing his treatment on an analysis of 595 cases, believed in abstention from intrauterine exploration; he had not had a single case of grave infection in a woman delivered in his clinic.

Le Lorier, originally an interventionist, has become a confirmed abstainer.

Concerning some rare varieties of sarcoma of the uterus. Auvray describes three cases: (1) a large sessile polyp of the cervix; (2) recalls a large cystic sarcoma of the fundus, originally shown before the Surgical Society in 1906 (the account here given does not conclusively prove its sarcomatous structure); and (3) the association in the same uterus of sarcoma of the body and epithelioma of the cervix.

Prolonged aseptic retention of placenta. One fœtus expelled at three months following a "shock"; the second fœtus expelled eight days later: after two months' quiescence hæmorrhage necessitated the manual removal of the placenta.

Myomectomy at the eighth month of pregnancy. Intervention undertaken to avoid risk of torsion of pedicle during pregnancy, labour or puerperium: no urgent symptoms; easy separation of pedunculated, subserous, fundal fibroid: onset of labour within 36 hours: living infant.

Note on the etiology of puerperal infection. In the course of some investigations to endeavour to establish a serological classification of hæmolytic streptococci, forty strains from post-partum or post-abortum cases were studied. Out of 18 cases from one clinic, 11 were included in one group; they were isolated from cases, usually grave, where there was no gross obstetrical trauma or obvious source of infection: the other seven came from cases in which there was usually obvious source of infection—gross trauma, obstetrical intervention, etc.

They note that during more than a year one special strain has thus infected, at intervals of several months, a number of patients in the one clinic.

They suggest that a carrier with a throat infection, having "scrubbed up" and possibly put on gloves, has to wait a little time until intervention is indicated; while talking the gloved hands have been infected by saliva droplets. They have no direct evidence to offer in support of their views; they suggest the wearing of masks, and propose prophylactic vaccination against the specified strain.

Emergency Porro Cæsarean section in the country: living mother and infant. Primigravida, 36 hours in labour, membranes ruptured 24 hours, forceps failure twice; distended bladder; over-riding head; Bandl's ring; maternal exhaustion; fœtal heart slow; enormous vulval œdema; bladder had to be punctured. Operation on the spot preferable to journey to hospital 60 kilometres away; Porro operation with drainage of pouch of Douglas chosen in preference to standard operation.

Conservative Cæsarean section 48 hours after onset of labour and after forceps failure. Patient in hospital throughout and difficulty anticipated owing to difficult forceps stillbirth in first labour; *i.e.*, allowed "test of labour" in favourable conditions with the probability of Cæsarean section being required.

BULL. DE LA SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE PARIS.

No. 6, 1923.

Fracture of pelvis : its obstetrical consequences. RIVIERE, MAURICE.

Fracture of the pelvis : induction of premature labour. RIVIERE, M., and BOURSIER, R.

Acute hydramnios : abdominal puncture : continuation of pregnancy. BOURSIER and GAUTRET.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE NANCY.

Concerning a case of acute tuberculosis (meningeal and hypophyseal) of the onset of pregnancy. FRUHINSHOLZ and COLLIN.

Wolffian cyst of the broad ligament. BINET and FOURCHE.

Delivery at term : long interval between the expulsion of twins. REMY.

Time of appearance of torsion of the umbilical cord. REMY.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE TOULOUSE.

Recurrent polymorphic pruriginous dermatitis in two successive twin pregnancies. LAURENTIE.

Central placenta prævia : Cæsarean section. Unexpected complication on the seventh day : gastro-intestinal hæmorrhages causing maternal death. LAURENTIE.

*Histological study of two Cæsarean scars. AUDEBERT and RASCOL.

Reflexions on a series of eight Cæsarean operations ; five conservative, three radical (Porro). AUDEBERT and FOURNIER.

*Hæmatometra and submucous juxta-cervical fibroid. Subtotal hysterectomy. Neoplastic degeneration of the cervix. Death a year later. FOURNIER.

Fibroid uterus with intraligamentary fibroid causing pressure symptoms. Subtotal hysterectomy. Cure. Specimen shown. FOURNIER.

" Fibroid pregnancy " (fibroid simulating pregnancy).

Hæmatometra and intrauterine polyp. Subtotal hysterectomy. Cure. Specimen shown. FOURNIER.

Fibroids and pregnancy. Removal *en masse* of the uterus and fibroids by hysterectomy. Specimen shown. AUDEBERT and FOURNIER.

*Ovarian cyst of lutein origin. Abortion. Removal of tumour.

Masculine syndrome with hypertrichosis before and after operation. FOURNIER.

Abscess of parotid in an infant aged three months. Incision : cure. FOURNIER.

Two cases of retained placenta following abortion in a bicornute uterus. DALEAS.

Histological study of two Cæsarean scars. Very brief description ; the macroscopic and microscopic descriptions are not quite in accordance. The union in one case is fibromuscular, in the other is barely distinguishable from the neighbouring uterine wall.

Hæmatometra and submucous juxta-cervical fibroid ; subtotal hysterectomy. Neoplastic degeneration of cervix. Death a year later. Patient aged 64 ; parity not stated ; recent hæmorrhage. Subtotal operation owing to dense, fibrotic infiltration about the cervix rendering a total operation impracticable. Hæmorrhage from small polypoid tumour of the cervix six months later ;

removal: papillary epithelioma. Radium treatment refused. Death from uræmia after a further six months.

Ovarian cyst of lutein origin. Abortion. Removal of tumour. Masculine syndrome with hypertrichosis before and after operation. The author endeavours to trace a similarity between this case and those of masculinity associated with suprarenal tumours. The evidence of masculinity is scanty, and in the unfortunate absence of any statement of the age of the patient is not grossly incompatible with menopausal onset.

BULL. DE LA SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE PARIS.

No. 7, 1923.

Cæsarean hysterectomy for fibroid and placenta prævia. RIVIERE and LACOUTURE.

*Five cases of dystocia due to deviation of the after-coming head. PERY.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE STRASBOURG.

Criminal abortion, multiple abscesses in the uterus, peritonitis. RIOTTE.

Concerning the diagnosis of intra- and extra-uterine pregnancy. SCHICKLE.

*Concerning the diagnosis of pregnancy complicated by fibroids. REEB.

Torsion of omentum during pregnancy. SCHOEFFER and KELLER.

Peculiar development of a large fibroid. BURGER.

Clinical features of an ovarian cyst. KREIS.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE TOULOUSE.

Torsion of a hæmatosalpinx subsequent to evacuation of a hæmatocolpos. LAURENTIE.

Two new cases of axial torsion of uterine fibroids without clinical signs. DAMBRIN and BERNARDBEIG.

*On the treatment of recurrent utero-vaginal prolapse. DAMBRIN and BERNARDBEIG.

A case of severe, early, hyperemesis gravidarum cured by suggestion. AUDEBERT and GAY.

Innocent tumour of the cervix and labour. AUDEBERT.

*Puerperal streptococcal septicæmia: cure. POUX and RASCOL.

A case of utero-placental apoplexy treated by hysterectomy. AUDEBERT and FOURNIER.

Suppurating cyst of the right ovary with necrosis of the anterior rectal wall. TOURNEUX and BAILLAT.

A fatal case of uræmia during pregnancy. GAY and RASCOL.

Observation showing the difficulty in diagnosis of pelvi-abdominal tumours and pregnancy. DAMBRIN and BERNARDBEIG.

Spinal anæsthesia in the treatment of pain in sclero-cystic oöphoritis. DALEAS.

Five cases of dystocia due to deviation of the after-coming head. Usually difficulty in extraction of arms, backward rotation or absence of forward rotation of occiput with chin hitching above pubes and partial extension of head; recommends forceps extraction.

The cord round the neck is suggested both in the paper and the discussion as a contributory cause. Details of the cases are given.

Concerning pregnancy complicated by fibroids. Emphasizes the difficulties of differential diagnosis and particularly of a joint diagnosis even after a laparotomy. Points out the diagnostic value in certain cases, of an alteration in the relative position of fibroids due to a growing pregnancy unequally displacing different fibroids.

On the treatment of recurrent utero-vaginal prolapse. Recommends the formation of a longitudinal vaginal partition as described by Cotte before the Surgical Society of Paris, and records one case where the operation was vetoed by the aged husband!

Puerperal streptococcal septicæmia: cure. Onset subacute, midwife's case, medical aid first summoned on ninth day; no local signs of pelvic infection. Blood cultures positive. Treatment: serum, apparently effective, "lantol" intravenously and fixation abscess.

BULL. DE LA SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE PARIS.

No. 8, 1923.

*Bladder troubles with uterine fibroids. HARTMANN and BONNET.

*Treatment of apparent death in the new-born by intra-cardiac injection of adrenalin. BRINDEAU.

Stereoscopic radiography in the study of the twin placenta. BRINDEAU and REGLADE.

*The future of infants borne by women affected with pulmonary tuberculosis and having infective sputum. COUVELAIRE.

Hydraulic delivery (of the placenta). GABASTOU.

Foreign body retained *in utero* five years. SEJOURNET.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE D'ALGER.

Tuberculosis and pregnancy. HOUEL and JAHIER.

Ovarian cyst: suppuration and discharge per rectum. Hysterectomy: cure. CONSTANTINI and FULCONIS.

Three different forms of purulent pleurisy during the puerperium. LAFFONT and CHOME.

Pregnancy and delivery in a woman with paraplegia due to hæmatomyelia. LAFFONT.

SOCIETE D'OBSTETRIQUE ET DE GYNECOLOGIE DE BORDEAUX.

*Pregnancy in a case of esthioméne: patient shown. RIVIERE, MAURICE, and BOURSIER.

Concerning two cases of suppurating vulvo-vaginal collections (Batholinian) complicating pregnancy and labour. ANDERODIAS and BALARD.

Vesical hæmaturia, complication of uterine fibroid. LOUBAT and MANGE.

Two cases of eclampsia. FAVREAU and Mme. FORGET-URION.

A rare variety of rupture of tubal gestation. ANDERODIAS and ROCHE.

Cæsarean hysterectomy for uterine fibroids with necrobiosis. ANDERODIAS and LOUBAT.

REUNION OBSTETRICALE ET GYNECOLOGIQUE DE MONTPELLIER.

*Hysterectomy for mole. DEVEZE.

A case of hydrocephalus, with specimen. VALLOIS.

Appendage infection or fibroid. DE ROUVILLE and MADON.

A case of pernicious anæmia during the puerperium. VALLOIS and COLL DE CARRERA.

Marked ascites of acute onset appearing a few days after hysterectomy for fibroids. DE ROUVILLE and COLL DE CARRERA.

Interruption of pregnancy for double pyelonephritis VALLOIS.

General œdema of the ovum. DELMAS, PAUL, and VILLA.

Bladder troubles with uterine fibroids. Abstract only. The full paper will appear in *Gynécologie et Obstetrique*. The note particularly an orthostatic pollakiuria, cystitis, hæmaturia and retention. The authors find retention in 3.5 per cent. of their series which they consider, for certain reasons, to be too high. Fibroids in the posterior wall were present in 26 cases of retention and in the anterior wall in nine, and they consider the retention to be due, in these cases, as in pregnancy cases, to stretching of the urethra rather than to compression.

Discussion by Couvelaire, Brindeau, Wallich, Le Lorier, Metzger and Siredey who agree with their explanation of the cause of the retention.

Treatment of apparent death in the new-born by intracardiac injection of adrenaline. Brindeau records three cases where cardiac function was restored but in all three respiration could not be established; autopsy revealed intracranial hæmorrhage in all three.

The future of infants borne by women affected with pulmonary tuberculosis and having infective sputum. The infants from birth are removed from contact with the mothers to avoid post-natal infection. Birth weights are only slightly below the average, and this may be due to the greater frequency of premature births, these being largely mechanical in origin.

An excessive neonatal death-rate; 38 per cent. in 61 cases during the first month, as compared with the average of 4-6 per cent. in France. Prematurity is not the sole, or even the main, cause, nor can they establish co-relation with the severity of the maternal affection.

After the first month the infant death-rate is approximately the same as in other infants.

Pregnancy in a case of ésthioméne: patient shown. Patient aged 21, primigravida. At eight years of age suppurating tuberculous glands in the neck; at ten supra-clavicular glands, at 13 left inguinal, and at 15 right inguinal; extension to vulva. At present cicatrization in neck as indicated, gross vulval deformity, ulceration, scarring and œdema, non-affection of labia minora and vestibule. Cæsarean section recommended and, as stated in footnote, practised successfully.

Hysterectomy for mole. The author records a case of hydatid mole, a portion of which he removed under the impression that it was a cervical (adenomatous) polyp and apparently did not examine microscopically. Five weeks later the mole was expelled; as the bleeding continued the uterus was evacuated with a blunt curette and the next day hysterectomy performed. A histological report of chorion-epithelioma, subsequently obtained, is appended.

The author seems to consider all moles as likely to be or to become malignant and favours hysterectomy if any bleeding occurs after evacuation (he does not state how soon the " lochia " should cease.)

He was severely criticized in the discussion. R. A. HENDRY.

Archivio di Ostetricia e Ginecologia.

September, 1923.

*The action of mammary extracts on the circulatory system, with a contribution to the knowledge of the mechanism of their action in the animal organism. SPIRITO, F.

*The action of mammary extracts on the suprarenal capsules with special regard to the variations of their contents in adrenalin. MANZI, L.

*The rate of sedimentation of inert powders in the plasma in pregnancy. PITIMADA, F. A.

*Post-anæsthetic cholæmia. ZAGARESE, F.

October, 1923.

*Post-anæsthetic cholæmia. ZAGARESE, F. (*continued*).

*The adrenalin content in the urine of pregnant women. BONARETTI, MARIA E. DAL C.

November, 1923.

*Tubercular infection of a uterine fibromyoma with intramural nodules in the isthmus of the tubes. SPIRITO, F.

December, 1923.

*Scars after Cæsarean section. BARBERA, A.

*The etiopathogenesis of abortion. RONSISVALLE, A.

*Cæsarean-Porro hysterectomy for voluminous myofibroma of the uterus obstructing the cavity. CLEMENTE, G.

The action of mammary extracts on the circulatory system, with a contribution to the knowledge of the mechanism of their action in the animal organism. Spirito's researches on the action of mammary extracts on the circulatory system were directed to their influence on the blood pressure. They were first carried out on animals and then on women. He prepared the extracts by mincing breast tissue and grinding it in a mortar with quartz sand, extracting with physiological solution. He found that extracts prepared by heat according to the method of Marfori for lymphatic glands, and that of Cova for placenta, were quite inactive, showing the thermolability of the mammary hormones.

He prepared extracts from mammary glands functioning and non-functioning of the cow, sheep, goat, and bitch.

For study of the pressure he morphinized a bitch and made an injection into the jugular vein, and with a manometer registered the variations of pressure in the carotid artery.

He found a lowering of the pressure, rapidly produced after injection of extracts made from active and inactive glands, rapidly returning to normal.

In experiments on women he used the commercial preparation of Mastasi Serono, 1 cc. of which corresponds to the juices of 1 gramme of gland tissue, from which it is possible to calculate the quantity of mammary gland tissue used in the experiment.

The experiments show that the depressant substance is easily absorbed and easily eliminated. With lowering of the pressure there is also a diminution of the number of heart beats, and this latter effect lasts longer than the first.

He found, in animals, that the extracts had a transitory vaso-constrictor action. The same happened in the vessels of a human uterus which had

been excised. On the muscular tissue of the uterus there is also an exciting action, with small doses, transitory and feeble, but not so transitory and feeble as in the case of the vessels. With large doses there is an inhibitory action on uterine muscle. He infers that the presence of mammary hormones in the circulation exerts an inhibitory action on the ovarian function.

Injections of mammary extracts produce hypertrophy and increased function of the suprarenals.

The action of mammary extracts on the suprarenal capsules with special regard to the variations of their contents in adrenalin.

(*a*) Mammary extracts injected subcutaneously in dogs produce in the suprarenal capsules a marked increase of adrenalin secretion, with hyperplasia and slight hypertrophy of the medullary substance, and to a less extent of the cortex.

(*b*) The action of the extracts is not due to their toxicity, their non-toxic action having been demonstrated by experiments on women in the clinic.

(*c*) The biological action of the mammary extracts may be due to the indirect vaso-constrictor action provoked by the increase of adrenalin, and not to the transitory local action of the extracts themselves.

The rate of sedimentation of inert powders in the plasma in pregnancy. Using kaolin and animal charcoal Pitimada found that sedimentation was much quicker in gravid citrated plasma than in normal plasma.

After a first precipitation of kaolin the plasma will precipitate a second quantity of kaolin still more quickly.

He considers that this may be due to the kaolin first added absorbed protein diminishing viscosity, so that the kaolin successively added would be precipitated still more quickly.

After parturition, the plasma rapidly loses its high power of sedimenting kaolin.

Post-anæsthetic cholæmia. Chloroform and ether narcoses are always followed by the appearance of bile in the blood. This cholæmia is more intense after chloroform narcosis than after narcosis with ether. It is directly proportional to the quantity of anæsthetic inhaled.

It appears immediately after the narcosis, becoming more intense on the following day, and disappearing in 48 to 72 hours. There exist individual differences, so that the same dose of anæsthetic may produce a greater or less cholæmia.

The cholæmia is inversely proportional to the post-operative arterial pressure as indicated by the pulse; while vomiting appears with the cholæmia and augments proportionally with it.

In ordinary cases of moderate cholæmia the bile pigments do not pass into the urine, but bile salts and urobilin are found. In intense cases of cholæmia the bile pigments and bile salts pass into the urine, but not urobilin.

Zagarese finds that cholæmia and vomiting are prevented by sustaining arterial pressure by the hypodermic injection of $\frac{1}{2}$ milligramme of adrenalin immediately before narcosis, but after 24 hours traces of pigment appear in the blood serum and traces of urobilin and bile acids in the urine. After 48 hours the cholæmia increases and there is greater quantity of bile acids and urobilin in the urine. Vomiting may occur.

By giving two hypodermic injections of adrenalin, one of ½ or 1 mgr. immediately before narcosis, and the other, ½ mgr., in the course of the following day cholæmia and vomiting are inhibited. He attributes the beneficial action of adrenalin to its vaso-constrictor property which prevents the lowering of the pressure by the anæsthetic.

The determination of the comparative amounts of pigments and of bile salts in the blood and in the urine shows that post-anæsthetic cholæmia is hepatogenous.

On the adrenalin content in the urine of pregnant women. Researches have shown that the suprarenal capsules, like most of the endocrine organs, respond to the stimulus of pregnancy by hypertrophy and hyperfunctioning, with the object of opposing a greater anti-toxic effect to the toxic state which is determined by pregnancy.

Using the sodic sulphate method of Pancrazio, Bonaretto did not find adrenalin in the urine in pregnancy, in labour, in the puerperium, nor during lactation; and only in four cases out of 150 did he get a very faint rose tint. He concludes that the adrenalin produced is destroyed in the organism.

Tubercular infection of a uterine fibromyoma with intramural nodules in the isthmus of the tubes. In her youth a married nullipara, aged 51, had a left exudative pleurisy from which she recovered in a relatively short time and has had no further trouble. Married at 27, no pregnancy, no venereal infection. For about six months a sense of weight in the lower abdomen, and severe, almost continual, lumbar pains have been present. She had a copious yellowish discharge. There was a slight pleuritic rub over the whole of the left half of thorax.

On examination the cervix was normal, the body of the uterus anteverted, anteflexed, and mobile, with a projection at the angle of the left tube. Adnexa on both sides somewhat enlarged and free from pain. Diagnosis: chronic metritis with probable intramural fibromyomatous nodules. A cutaneous tuberculin test gave a modified reaction. Subtotal hysterectomy was performed and the post-operative course was normal.

The peritoneal surface of the uterus was smooth, and a globose mass, the size of a hen's egg, in the anterior wall projected into the uterine cavity. On section, beneath a zone of muscular tissue, was neoplastic fibromyomatous tissue showing zones of necrosis. The right tube was double the normal size, and showed numerous necrotic zones. The left tube contained a hard nodule, the size of an almond, and another the size of a pea.

Histological examination. The mass in the uterus showed typical tubercles around the necrotic zones. Typical tubercles were scattered here and there in the mucosa, with occasional caseous foci.

The right tube showed mesosalpingitis, large zones of necrosis, and disseminated tubercles.

A nodule in the left tube showed tubercles in a tissue of small-celled infiltration. Scattered throughout this tissue were spaces with simple cylindrical epithelium, these cavities being traceable to the pre-existing tube cavity.

The ovaries were fibrosed and cystic. No tubercle bacilli could be demonstrated.

Spirito states that this case shows that a pre-existing and old tubercular lesion, even in a period of latency, had given rise to extensive infection of

the genital tract. Such a lesion may produce no symptoms and may exist without causing any suspicion of its existence.

Scars after Cæsarean section. Histological examination of the scars following Cæsarean section showed clearly that reproduction of muscular tissue in a uniform manner and in normal quantity did not occur. Connective tissue was found traversed here and there by few and slender muscular bundles, most of the bundles being arrested at the margin of the cicatricial tissue and parallel to it. During the operation of subtotal hysteroannexiotomy there were found strong adhesions between the parietal peritoneum and the anterior surface of the uterus and between this and the epiploon in the region of the old Cæsarean cicatrix. There had evidently been a suppurating process following the first Cæsarean section, the scar of which is described above. Barbera concludes that in the absence of suppuration and in the presence of primary union muscular tissue is reconstituted in the scar.

The etiopathogenesis of abortion. A woman, 28 years of age, had had no illnesses beyond 15 days of influenza five years ago. Menstruation commenced at 20 and was abundant and painful until marriage at 21, when the periods suddenly became quite regular. She had three pregnancies, all delivered by forceps. The fœtus was dead in each case and the puerperium was always febrile. The last occurred four years ago. Eight days ago, when about four months pregnant, she fell on the stairs. After three days there was a slight loss of bright red blood. On the following days the losses were a little more abundant, and she began to have pain in the lumbosacral region, the pain increasing in intensity. After some days, noting elevation of temperature and general malaise, she sought admission to the clinic. The Wassermann reaction, with two antigens, was negative.

Spontaneous expulsion of the ovum, complete in all its parts, occurred. The temperature was 39.5 C. Considering that the fever indicated an infective condition which might be the essential cause of the abortion, blood was taken from the cephalic vein and sown on agar-agar and in peptonized broth. At the same time cultures were made in these media from the amniotic fluid, from the peritoneal fluid, from the blood, and from the liver of the fœtus. To exclude the possibility of contamination of the above-named material the bag of waters had been opened aseptically. After 48 hours at 37° C. all the cultures showed a pure growth of a micrococcus which in morphological and cultural characters corresponded to the micrococcus melitensis.

Search for the malarial plasmodium was negative. Ten cc. of blood from the cephalic vein was used partly to repeat the Wassermann test, partly to ascertain its agglutinating power and the deviation of complement in the presence of the micrococcus isolated and obtained in pure culture.

The Wassermann reaction done with two antigens was again negative; the serum-agglutination was negative; the deviation of complement by the micrococcus isolated from the maternal blood and from the fœtal blood was clearly proved.

An auto-serum vaccine was prepared, and on the tenth day of the puerperium 1 cc. of vaccine was injected. The temperature, which after the abortion was 39.5°, and some hours afterwards was 36.2°, rose on the following evening to 38.9°, oscillated on the following days between 37.3°

and 38.7°; on the fifth and again on the seventh day rose to 40° and 40.1° respectively, preceded on both occasions by an intense rigor.

The second and third injections were both followed by a rise to 40.2°, lasting some hours. 1 cc. of vaccine had been injected daily. A daily intravenous injection of 5 cc. of urotropin in 25 per cent. solution was also given. Some hours after the last injection the temperature began to fall, and a rapid recovery ensued. On discharge from the clinic the gynæcological examination showed the uterus twice the normal size, retroflexed, mobile, and slightly painful to palpation, with left salpingo-ovaritis.

It is to be noted that when this patient was admitted to the clinic she was already febrile, but the cervix was entire and the external os was completely closed. She presented no symptom of infection of the genital passages, the fœtus was living and the fœtal heart beats were perceived up to some hours before the expulsion of the ovum. From the blood of the mother and from the blood and organs of the fœtus there was isolated in pure culture an organism having the morphological and cultural characters of micrococcus melitensis. After expulsion of the ovum, neither in the uterine cavity nor in any other part of the internal genital tract was there any infective process, yet the patient continued to have fever ranging from 40° to 41° C.

All this justifies the suspicion that not the fall but the septicæmic process in the mother, due to the organism which was isolated, determined the interruption of pregnancy. It has been proved by many veterinarians that micrococcus melitensis is the most frequent cause of abortion in goats. Ronsisvalle refers to other severe cases of puerperal infection cured by auto-vaccine therapy, and he draws attention to the fact that although urotropin was also used yet injection of the vaccine was followed by an abrupt rise of temperature, an expression of the specific reaction of the organism, and that thereafter there was a rapid fall of temperature and cure.

Cæsarean-Porro hysterectomy for a voluminous myofibroma of the uterus obstructing the cavity. Clemente records a case of obstructed labour in a primigravida, aged 41, due to multiple myofibromata of the uterus in which he successfully performed a Cæsarean-Porro hysterectomy.

J. R. FORREST.

Boletin de la Sociedad de Obstetricia y Ginecologia de Buenos Aires.

October 11, 1923.

*Death of fœtus from twisting of umbilical cord round a strand of amnion. PEREZ, SOSA and SANCHEZ.

Ligature of the hypogastric arteries in Wertheim's operation. PICCARDO, T.

October 25, 1923.

*Intramural hydatid cyst of the uterus. VILA, E. L.

A variation of technique in subtotal hysterectomy. PICCARDO, T.

Value of phlorizine glycosuria in early diagnosis of pregnancy. BERMAN, S. E.

November 15, 1923.

Interstitial pregnancy. AHUMADA, J. C.

Traumatic rupture of an ovarian cyst during labour. PASMAN, F.

Uræmic psychosis in the puerperium. PEREZ and BAZAN.
Uterine myomata—Rœntgen therapy—acute utero-ovarian thrombo-phlebitis. AHUMADA, J. C.

November 29, 1923.

Tubercular salpingitis. BERMAN, S. E.
Myomectomy and pregnancy. LASTRA, T.
Medico legal aspect of embryotomy on the living fœtus. COSTA, P.

Fœtal death from torsion of the umbilical cord round an amniotic adhesion. The authors refer to the views of Brindeau and others on the part played by the amnion in causing fœtal monstrosities and malformations, from strangulation of the cord, and describe a case in point.

The patient (ii-para) was admitted to hospital for premature labour in the eighth month of pregnancy. The day after admission she gave birth to a macerated fœtus which was attached to the placenta by a strand of amnion adherent to its forehead, and round which strand, as axis, the umbilical cord was spirally twisted. The lumen of the cord was not occluded, but the vessels were. The fœtus showed a number of malformations; double hare-lip, cleft palate, absence of the nasal bones, a supernumerary finger on one hand, and on the other hand one finger and the last phalanges of three fingers were wanting.

The deformities of the head were due to the action of the amniotic adhesion, which, as an alien element, hindered the fusion of the nasal plates and the palate bones. It is an open question whether the process of amnion was due to an inflammatory lesion of the amnion, or simply to its arrested development. Cases have been studied by the authors, where evidently syphilis had caused inflammation of the amnion, but in the present case the history and Wassermann reactions of the patient and her husband were negative. In the sixth month of pregnancy she had had a severe attack of influenza, after which she noted fœtal movements had ceased. Possibly the affection of the amnion may have been due to general toxæmia.

Intramural hydatid cyst of the uterus. Vila describes a case of primary hydatid cyst of the uterus occurring in a girl of 15 years. The history and physical signs of the patient led to the diagnosis of right ovarian cyst fixed in the pouch of Douglas.

Infra-umbilical laparotomy was performed and, as a cystic process was seen adhering to the appendix, it was detached and the appendix was removed. Both ovaries and tubes were extra-pelvic and macroscopically normal. The original diagnosis was thus eliminated, and examination of the uterus was made. This was found behind the symphysis pubis covered by the tumour, which had evidently developed from the posterior uterine wall. On the sacral promontory was a small circular ulcero-necrotic patch, where it had caused caries of the bone. A cysto-sarcoma of the uterus was suspected, because of the necrosis of the sacrum, and also because of the presence of diseased glands in the right and left hypogastric and in the lumbar regions. Further exploration of the abdomen showed that the higher glands were unaffected, and there was no metastasis in any other organ.

It was considered wise to remove the tumour without puncture, and also to perform total hysterectomy, conserving the ovaries.

Histological examination of the tumour and uterus showed that the fluid contained a great number of hooklets, but no daughter cysts.

The smooth muscular fibres of the posterior uterine wall had been separated and were continued in the thinnest portions of the cyst walls. This seemed proof of the intramural origin of the hydatid embryo, while the absence of any pathological tract in the abdomen and the subsequent leucocytic formula of the patient, pointed to the primary nature of the cyst.

J. H. FILSHILL.

Archiv für Gynäkologie.

Band 120, Heft 2.

Morbid conditions after narcosis and their prophylaxis. NURNBERGER, L.

Hypnosis as a therapeutic adjunct in gynæcology. DICK, W.

*Carcinoma ventriculi and pregnancy. SCHMIDT, H. H.

Action of alcoholic and ethereal extracts of the blood of pregnant and non-pregnant animals and of the human species, with respect to uterine tonus. LONNE, F.

The cause of death after ligature of the great abdominal blood vessels. OFFERGELD.

Dystocia from contraction of Bandl's ring. VOGEL, W.

The body weight during pregnancy, parturition and the puerperium. KEMPER, W.

A new explanation of placenta circumvallata. LAHM, W.

*Syphilis of the portio or carcinoma? LAHM, W.

Concerning the essential identity of so-called different species of streptococci. PHILLIPP, E.

Vulvo-vaginitis infantum. KAHN, A.

Folliculoma ovarii carcinomatodes. ULESKO-STROGANOWA, K.

Epithelial dysplasia in the vagina. SCHILLER, W.

Band 120, Heft 3, *March* 20, 1924.

Studies concerning the testing of the virulence of streptococci. CARL RUGE, II.

The obstetrical significance of latent infections, with remarks concerning decidual alterations in polypi of the portio. HEIDLER, H.

Results of treatment of 536 cases of carcinoma of the genital organs from 1914—1920. SCHULTE, J.

Does hæmophilia exist in the female? BAUER, K. H., and WEHEFRITZ, E.

The mechanism of birth. MUELLER, A.

Concerning the loss of weight which occurs towards the end of pregnancy. KEMPER, W.

Researches concerning alterations of metabolism and of body weight in pregnancy. MANNERT, A.

The effects on the pregnant organism of a diet rich in protein, with special reference to formation of urea. KABOTH, G.

Carcinoma ventriculi and pregnancy. The cases are described (1) of a x-para aged 41, whose uterus was infected early during labour and who died from hæmorrhage two hours after expulsion of a dead full-time fœtus: autopsy showed carcinoma of the pylorus; (2) of a ii-para, aged 24, who after four months' amenorrhœa was thought to have acute rupture of an ectopic

gestation—operation showed uterine pregnancy, cancer affecting the pylorus, and lesser curvature and a large twisted metastatic tumour of the left ovary. Total hysterectomy was done : a later cœliotomy showed the gastric tumour to be inoperable. The coincidence of carcinoma ventriculi and pregnancy is rare and the writer has found only 42 other cases mentioned in the literature. Fœtal mortality appears to be about 65 per cent. and no maternal recovery is recorded.

Syphilis of the Portio or carcinoma? A patient, aged 32, who had complained of irregular bleeding for four months, was found, when sent to an X-ray clinic, to present signs of cachexia and a large ulcerated swelling of the portio : only the presence of a few small outgrowths near the vulva and interrogation of the husband pointed to a diagnosis of syphilis rather than carcinoma. Microscopical examination of a fragment showed characteristics associated with both conditions and a double pathology was diagnosed. After treatment by salvarsan and by X-rays in small dose the clinical character of the ulcer became perceptibly worse, and treatment of carcinoma by massive X-ray doses was contemplated. This the patient evaded, and four weeks later the ulceration was found to have disappeared, although there was some residual (syphilitic) induration. W. E. CROWTHER.

Zentralblatt für Gynäkologie.

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A simplified procedure for the production of artificial pneumothorax.
*The treatment of puerperal tetanus with intracranial serum injections. FRITSCH, K.
*Studies on the corpus luteum of pregnancy in cattle. KALTNER, A.
The treatment of perforation of the uterus. SCHWAB, E.
Is morphine an antidote for scopolamine poisoning? SHUBE, H.

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Trials with the Sellheim inflator for testing the patency of the Fallopian tubes. SELLHEIM, H.
*Abdominal *versus* vaginal operation in carcinoma of the cervix. HOLBAN, J.
*Blindness after uterine hæmorrhages. RETZLAFF, O.

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*The twelve year old discussion on febrile abortion. WINTER, G.
The relation of the height of the boundary zone to the development of the os uteri according to Schalz-Unterberger. SEYFFARDT, H.
Hæmolysed own blood as an unspecific stimulant. ZIMMERMANN, R.
The treatment of puerperal diseases of the breast with light. TEMESVASY, N.
Calcophysin, a new medicament for the control of uterine hæmorrhage. BOCK, A.

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*Middle line in the treatment of eclampsia. ZWEIFEL, P.
*Ileus *sub-partu*. HORNUNG, R.
*Myeloperiosteitis in the pubis after abortion. HIESS, V.
Dysmenorrhœa in relation to constitution. HIRSCH, M.

No. 40, *October* 6, 1923.

*The prognosis of heart lesions in pregnancy. FREY, W.

Convertability of Meinick's precipitate reaction (M.T.R.) with cholesterin and cholesterin-free extracts, in midwifery. THALER, H.

*Observations on untreated ectopic gestations and their fatal results. KATZ, H.

*Experience of Röntgen ray treatment of uterine carcinoma. KRAUL, L.

No. 41, *October* 13, 1923.

The major operation in fixation of vesico-vaginal fistula to the pubic bone. KEHRER, E.

Operative treatment for urinary incontinence. SCHOENHOLZ, L.

On the treatment of injured ureters which cannot be implanted. STOECKEL, W.

No. 42, *October* 20, 1923.

Reply to Dr. Flatau. WINTER, G.

Interruption of pregnancy and sterilization. Temporary sterilization. FREUND, H.

The genesis of icterus neonatorum. TUROIT and TEZNER.

Influence of syphilis on premature birth. BAUMM, H.

Collifixation of the uterus (Bumm's method). KEITLER, H.

A case of post-operative gonococcal parotitis. WITTWER, K.

No. 43, *October* 27, 1923.

The question of air and gas embolism during parturition. KOERTING, W.

Vagotonia as a sign of pregnancy. LOUROS, N.

The pathogenesis of corpus luteum cysts. VOGT, E.

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The principle of least compulsion as the law of birth. A reply to Arthur Mueller's treatise, "The mechanism of birth." SELLHEIM, H.

The birth mechanism in the light of biologic law. STRUHE, H.

*Reduction of the ovaries to influence menstruation. KOHLER, R.

*Interruption of pregnancy. STRATZ, C. H.

Dr. Zweifel and "the middle line in the therapy of eclampsia." A short reply. ENGELMANN.

Correction of Stickel's report on my work, "The therapy of eclampsia based on observations of saline retention." CHRISTIANI, A.

A case of excessive cystic hyperplasia of the whole endometrium. WESTPHAL, U.

No. 45, *November* 10, 1923.

Histology of the hypophyseal glands in cancer and sarcoma as compared with their histology in pregnancy. BERBLINGER and MUTH.

*Leucocytosis and sedimentation of erythrocytes in extra-uterine pregnancy. Diagnostic application. GRAGERT, O.

*The symptomatology of ruptured ectopic gestation. HOROAT, A.

A further contribution on cases of ovarian pregnancy. MERTENS, H.

A case of ileus in pregnancy. FIRTH, J.

*Yohimbin as a galactogogue. NOLLE, H.

No. 46/47, *November* 17, 1923.

Duration of pregnancy and social conditions. PELLER, S.

Spermatozoa in glands of the cervix. NIEDERCHE, W.

Infection of breast-fed children from maternal mastitis. RUNGE, H.
Perflation of the Fallopian tubes. OTTOW, B.
A simple arrangement to prove the passage of air through the Fallopian tubes. ENGELMANN, F.
Simplified method to prove permeability of the tubes. MANDELETAMM, A.
Reply to Dr. F. Engelmann's communication. ZWEIFEL, P.
Pressure sensation on the rectum as a sign of the expulsion of the placenta from the body of the uterus. CALMANN, A.
Hæmatoma of pelvic tissue " sub-partu." PEYSER, F.
Hyperemesis (cholactol and saline treatment). KIRSTEIN, F.
A variation in the Sehrt-Engelmann method of aortic compression. FUTH, J.
Behaviour of blood platelets under the influence of saline. ROSLER, A. H.

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Icterus neonatorum and hæmoclastic crises. HALNISS, E.
Icterus neonatorum and Widal's reaction. LINZENMEIER, G., and TOANIG, F.
High forceps. HIESS, V.
Injury to umbilical cord through forceps delivery. GAUSSBAUER.
Kasper Blond's " Decapitation thimble." HEIDLER, N.
Action of the uterine muscles due to ionisation in douches. MERDLER, C.
Head and feet presentation. BENDA, R.
Metastatic ovarian tumour in pregnancy. TUROLT, M.
*A case of intra-uterine fœtal cry. NYSTROM, B.
Anaphylactic shock after injections of caseosan and physormine. BURCKHARD, G.
Yatren-Kasein in treatment of adnexial tumours in general practice. RIEK, F.
*Torsion of an ovarian tumour in a child of six years. HEINZE, E.

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A case of hæmorrhage from the bladder after Röntgen-radium-raying. SCHUGT, P.
Treatment of resected ureters which could not be implanted. WAGNER, G.
Position of ureters and kidneys as cause of incontinence of urine. SCHOENHOLZ, L.
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Inoperable carcinoma of the cervix. HOLZBUCH, E.
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Thrombosis of both renal veins in a newly-born infant. HELIER, S.
The diagnostic value of stalagmometric urine examination. MATUSOVSKY, A.

No. 52, *December* 29, 1923.

The demand for the erection of aseptic partitions in hospitals. SIPPEL, A.
*The Alexander-Adams operation. LEHRNBECKER, A.

The treatment of puerperal tetanus with intracranial serum injections. Fitsch records a case of tetanus in a woman aged 41 which developed with a gradual onset on the twelfth day after an abortion. Tetanus antitoxin was injected subcutaneously, by lumbar puncture, and under the cerebral dura between the coronal and sagittal sutures. Enemas of magnesium sulphate were also administered. The patient recovered.

Studies on the corpus luteum of pregnancy in cattle. Kaltner mentions Hofstätter's findings in rabbits that there is only a loose connexion between the number of impregnated ova in the uterus and the number of corpora lutea. Kaltner investigated this subject in slaughtered cows and in 300 cases found a numerical agreement in 98.3 per cent., there being an excess of corpora lutea in 1.7 per cent. The corpus luteum was invariably present in the ovary on the same side as the pregnant horn of the uterus; hence migration of the ovum had not occurred. In 64 per cent. pregnancy occurred on the right side and in 36 per cent. on the left, pointing to increased functional activity of the right ovary. The weight of the corpus luteum varied from 4 to 4.5 gm., with an average of 4.26 gm. In eight twin pregnancies two corpora lutea were present, each smaller than that of a single pregnancy. Where the fœtus was dead, macerated or mummified, the corpus luteum showed no differences from that of normal pregnancy.

In five cases two corpora lutea were found in single pregnancies, indicating either that only one of the two ova shed was fertilized, or that if both were fertilized, death and resorption of one fœtus resulted. As the most careful search revealed no trace of fœtal remains or membranes, the former view appears the more likely.

Abdominal versus vaginal operation in cancer of the cervix. Halban considers that the abdominal and the vaginal methods of operation for carcinoma of the cervix are of equal value. The choice of method may therefore be left to the operator. A combination of both methods may give better results when the abdominal walls are thicker than usual and when the Trendelenburg position is contraindicated.

Blindness after uterine hæmorrhages. Retzlaff records the case of a woman aged 42 who became blind in both eyes after severe and prolonged uterine hæmorrhages during the menopause, prior to which the vision had been normal.

The twelve year old discussion on febrile abortion. Winter's statistics embrace 24,000 febrile abortions collected during the last twelve years. Streptococci produced the highest mortality, 15.5 per cent., the hæmolytic variety giving 20.8 per cent., and the non-hæmolytic 11.1 per cent. Staphylococci gave an 8 per cent., B. coli 7.3 per cent. and saprophytes 3.1 per cent. mortality. Two types of febrile abortion are distinguished: (1) parovular, in which the decidua, cervix or vagina is primarily infected, and (2) ovular, in which the ovum is primarily infected. The uncomplicated cases, in which infection is limited to the uterus, are contrasted with the complicated cases in which infection has spread to the parametrium. In the uncomplicated cases the mortality was 2.7 per cent., independent of treatment or of the nature of the infecting micro-organism. In complicated cases the mortality was 47.5 per cent., the deaths being due to diffuse peritonitis, pyæmia and septicæmia. Winter concludes that early evacuation of the ovum is the best treatment, for in the ovular type the source of the trouble is eliminated, in the perovular type involution occurs after evacuation, and the chance of infection spreading is minimized by closure of the lymph spaces and by the diminished circulation. Spontaneous evacuation is best, and this resulted in 72 per cent. of the cases from the use of quinine, given ovally, intramuscularly or intravenously. The mortality was one per cent. Expectant treatment, which is often warranted in streptococcal infections, as the streptococci

may disappear, being overgrown by saprophytes, gave a mortality of 1.1 per cent. With active manual treatment the mortality was 2.9 per cent., the danger being greatest in complicated abortions. By active treatment with a blunt curette Schöttmuller cured 33 cases infected with hæmolytic streptococci. The advantages of this method over manual removal are stated to be that in the absence of pressure and squeezing by the external hand, the uterus is allowed to remain quiet and extra-uterine infections are not disturbed. In manual removal the external hand may break down freshly formed adhesions, may rupture adnexal tumours, and may loosen thrombi and force the bacteria further into the lymph spaces.

Middle line in the treatment of eclampsia. According to Zweifel the blood in eclampsia has an abnormally high specific gravity, and blood-letting has no mortality. Sedatives are also given. Sixty-three cases were treated by venesection, 1,400 to 1,800 cc. of blood being withdrawn. All recovered. Zweifel considers that Cæsarean section is not necessary.

Ileus sub partu. In Hornung's case pressure of the uterus at term had caused intestinal obstruction in a parturient patient. After delivery the obstruction was maintained by the pressure of the evacuated uterus, so that laparotomy became necessary.

Myeloperiosteitis in the pubis after abortion. Hiess describes a case of acute inflammation of the pubic bones, following a ten weeks' abortion in a girl aged 17 years. Three days before the abortion she fell down some steps, was considerably bruised over the sacrum, and complained of pain round the abdomen. After the abortion she was eight days in bed without complaining of pain or suffering from rigors or rise of temperature. Two days after getting up she was suddenly seized with violent pain over the symphysis. The pain increased in severity and was accompanied by rigors and a rise of temperature. She was unable to walk and the least movement of the limbs caused pain. On admission to hospital there was œdema over the symphysis, and widening of the cleft of the symphysis with mobility of the pubic bones and great tenderness on pressure over the symphysis.

For two months after admission, pain and tenderness continued, and there was an evening rise of temperature. Then the temperature became normal, the pain lessened, and after three months the patient left hospital free from pain and walking without difficulty.

She was X-rayed five times, and on the first and third occasions blurring of the horizontal rami of the pubic bones gave rise to the diagnosis of caries. In spite of the patient's apparent recovery, the final X-ray examination showed no regenerative elements in the bones, and atrophy of the ascending rami of the pubes. There was no pus formation. Clinically the illness resembled osteo-malacia, which shows a preference for individuals whose bony growth is incomplete, but osteo-malacia of the pubic bones is very rare, on account of the absence of spongy tissue. To support the diagnosis of caries, it was found that the intra-cutaneous test for tubercle was strongly positive, and that the patient frequently had phlyctenules of the conjunctiva, suggesting tubercular affection. The lungs were unaffected. Tubercular disease of the pubic bones is common, but it often leads to fistula in the adductors. The disease was thus a myeloperiosteitis caused by a less virulent organism than either that of tubercle or of osteo-malacia.

The prognosis of heart lesions in pregnancy. Frey considers that the prognosis of heart lesions in pregnant women is not so grave as is generally supposed, seeing that only two per cent. of his cases died. Contrary to current opinion he states that mitral stenosis gives a worse prognosis than aortic lesions owing to sclerosis of the pulmonary arteries which puts a greater tax on the conducting power of the right ventricle. The duration of life is longer in mitral stenosis than in mitral incompetence. Immediately following delivery is the most dangerous time, as the blood then collects in the pelvic vessels and the heart is incompletely filled so that contractile energy is diminished. The prognosis depends less on the nature of the heart lesion than on the condition and conducting power of the heart muscle, whilst complications of pregnancy greatly affect the prognosis. In acute endocarditis, both in primigravidæ and in multigravidæ, pregnancy should be terminated without delay, as it causes rapid development with severe damage of the myocardium.

The diagnosis is difficult and the condition is often overlooked, but a rise of temperature with the onset of anæmia and tachycardia should arouse suspicion. Cases showing failure of compensation without inflammatory changes should be treated conservatively by physical and psychical rest, diet, and digitalis by the mouth. In addition strophanthin should be given intravenously for threatening insufficiency, whilst squill is to be preferred for protracted cases, as it is less cumulative in its action. If improvement is not shown the pregnancy should be terminated. In fully compensated cases without inflammatory changes termination of pregnancy is not required. Sterilization is not advised in patients for whom pregnancy has been terminated artificially, as recovery usually ensues and the power of conduction is restored. All cases of mitral stenosis, however, should be carefully watched, the most dangerous being those which are rapidly advancing.

Observations on untreated ectopic gestations and their fatal results. Katz discusses the risks of untreated cases of ruptured ectopic gestation, basing his conclusions on a study of inquests held in the Medico-juridical Institute of Vienna (1919—1920) on 31 women (ages 20—42 years), who had died suddenly after acute abdominal attacks.

In all these cases death was found to be due to internal hæmorrhage from a perforated tubal pregnancy. In only three cases had the correct diagnosis been made. In the others death had been attributed to various causes, such as perforation of the alimentary tract from gastric or duodenal ulcer, appendicitis, pancreatitis, and poisoning from food or drugs. In one case in which the illness happened after extraction of a tooth under cocaine, death was attributed to cocaine poisoning.

In only five cases had the patients suspected their condition, and in 16 cases no doctor had been summoned, as the illness was thought to be due to ordinary causes, and within two or three hours the patient died. In most cases, however, some hours or days elapsed between the first appearance of symptoms and the fatal issue. Constitutional or pathological conditions, doubtless, played a part in causing death. In some of the younger women a persistent thymus was found, in others heart or arterial lesions, uterine myomata or enlarged spleen, and in two-thirds of the number the internal genitals were extensively inflamed and the adnexa were adherent to the rectum, appendix or cæcum.

Katz considers that operative interference, in all cases where internal hæmorrhage is suspected, is the safest course to adopt, and that the operation should be performed immediately.

Experience of Roentgen ray treatment of uterine carcinoma. Kraul describes the technique and results of treatment by Röntgen and radium raying in absolutely inoperable cases of uterine carcinoma. Some patients had never undergone operation, whilst others were suffering from recurrence after operation.

It was found that if three series of treatment either by Röntgen or radium rays had no effect, further application was useless.

Injections of novocaine or adrenalin proved useful adjuncts in relieving pain due to ulceration or necrosis, and ulceration was also lessened by injections of polyvalent staphylococcic or streptococcic sera.

Cure occurred in comparatively few cases, but in all the treatment lengthened the duration of life and relieved pain.

In cases which had not undergone operation the average duration of life from first recognition of symptoms was 415 days, whilst in recurrences the average duration was 750 days.

In untreated cases the average duration of life was 239 days.

Reduction of the ovaries to influence menstruation. Köhler publishes observations on the treatment of atypical menstrual hæmorrhage, which drugs or organo-therapy had failed to cure. Since 1914 he has treated seven such cases by resection of the ovaries and succeeded in restoring menstruation to normal limits. Six of the patients suffered from general tuberculosis, where the malady indicated the advisability of artificial abortion and subsequent sterilization. The seventh patient was a girl of 17 years who had had persistent hæmorrhage for three years, and to whom curetting and injections of internal glandular secretion had given only temporary relief. The whole of the left ovary was removed and two-thirds of the right. The first period after the operation was somewhat profuse, but from that date till 1921 the intervals between menstruation and its duration became normal.

In the six tubercular cases over two-thirds of both ovaries were taken away. In four cases menstruation became normal, and the general health of the patients improved. One patient left Vienna and so her record of progress could not be traced. The internal secretory function of the ovaries did not seem to be affected, as in no case was there observed the usual outward sign of increase in fat deposit which follows entire removal of the ovaries.

The author thinks that in view of the small number of cases which he has personally treated, further investigation would be advantageous.

Interruption of pregnancy. Stratz criticizes the views of certain Dresden gynæcologists that the artificial induction of abortion might be carried out by every general practitioner, even in his consulting hours. Though theoretically there are many indications for interruption of pregnancy, the author holds that the general practitioner is very rarely obliged to undertake such cases, and that considering the dangers of the operation it should in nearly every case be referred to hospital, and to experienced surgeons. If anyone undertakes the operation in his consulting room he ought to know the full justification for the outcome, but that if he does know it, he will not undertake the operation!

Leucocytosis and sedimentation of erythrocytes in extra-uterine pregnancy. Investigating the question of leucocytosis and sedimentation of the red blood corpuscles in extra-uterine pregnancy Gragert found that: (1) In extra-uterine pregnancies without much bleeding there is no leucocytosis and the time of sedimentation of the red cells is normal or but slightly accelerated. (2) In tubal abortion there is a normal leucocyte count, unless the bleeding has been severe when a post-hæmorrhagic leucocytosis is found. Where bleeding has been prolonged and irritation set up a leucocytosis occurs. Sedimentation of the red cells is accelerated in tubal abortion, especially where there is loss of blood, when the acceleration of sedimentation is proportional to the loss. In early tubal rupture the leucocyte count is normal, but where bleeding has been protracted there is a post-hæmorrhagic leucocytosis with acceleration of sedimentation. The author gives diagnostic application to his findings. Tubal abortion can be diagnosed from acute and subacute adnexitis by the normal leucocyte count and the accelerated sedimentation, though post-hæmorrhagic leucocytosis may introduce a source of error. A retro-uterine hæmatocele can be differentiated from an inflammatory mass in the pouch of Douglas in the same way. The differential diagnosis of an ovarian tumour with a twisted pedicle from a ruptured extra-uterine gestation sac is difficult, accelerated sedimentation and normal leucocyte count suggest a tubal rupture and not an inflammatory lesion. Gragert concludes that the leucocyte count and sedimentation test are of great value in cases of doubtful diagnosis.

The symptomatology of ruptured ectopic gestation. Horvat describes a case of ruptured ectopic gestation occurring in a married nullipara aged 24 years. Two months after a menstrual period the patient was seized with acute abdominal pain, sickness and vomiting. The symptoms began early in the morning and grew steadily worse throughout the day. Thirst was extreme, and drinking of fluids caused vomiting to become more frequent. At five o'clock she was removed to hospital. No urine had been passed throughout the day and catheterization after admission yielded only a few drops, insufficient for chemical examination. There was dullness over the lower abdomen and slight resistance in the region of the right adnexa.

A provisional diagnosis of extra-uterine pregnancy with pelvic hæmorrhage was made. The pouch of Douglas was incised and laparotomy was performed. A large quantity of fresh and clotted blood was present in the pelvis and a ruptured ectopic sac was found in the middle of the left Fallopian tube. The tube was excised. The post-operative course was normal and the patient left hospital after nineteen days. The day following operation the urine became normal in secretion and constituents.

Though the anuria at first veiled the diagnosis of extra-uterine gestation, Horvat calls attention to it to confirm the claim of Piskacek (*Zentralblatt f. Gynäkol.*, 1923, No. 23), in publishing a similar case, that anuria is not a complication but a symptom of fresh outpouring of blood into the pelvis. The anuria may be due to the constant vomiting and hæmorrhage, to peritoneal irritation or to shock, but it may also be regarded as a consequence of diminished blood pressure which was insufficient to cause filtration through the glomeruli. Though anuria has not been noted in every case, Horvat thinks that it may be estimated as the "renal symptom," just as Herzfeld has described a "phrenic" and a bladder symptom.

Further investigation may determine that it is a sign of prognostic significance.

Yohimbin as a galactagogue. Nölle refers to the proved efficacy of yohimbin in veterinary medicine where it is used under the name of yohimvetol.

He describes cases where, as other means had failed, he decided to employ it in practice and had obtained good and even brilliant results. The only case in which it failed was a woman whose mother and sisters had been unable to nurse their children and in whom there was an inherited and constitutional mammary defect.

From one to seven daily injections (from .001—.005 gm.) were given. As this drug has a hyperæmic effect on the sex organs, he feared it might cause an increase in the lochia, but this did not occur. Neither did he find his patients adversely affected in their general health, though its use is said to give rise to such symptoms as faintness, palpitation, sleeplessness and headache. He has not yet investigated whether it can be given orally with the same effect as by injection.

A case of intra-uterine fœtal cry. Nystrom, referring to the rare occurrence of the so-called " Vagitus Uterinus," quotes Bumm's statement that very few obstetricians had ever heard it, and that in 400 cases of version he had never heard it. Nystrom publishes a case which occurred in 1923.

The woman had had two normal confinements, but when labour began in her third it was found that a coil of pulsating cord lay behind the membranes and in front of the head. Digital reposition was tried unsuccessfully at home, and the patient was sent to hospital in case of strangulation of the cord, so that delivery might be accomplished by version and extraction. Under ether narcosis the membranes were ruptured and the head pushed to one side in order to pull down a foot, while at the same time the coil was pushed back. When the head was touched those standing round distinctly heard repeated cries from the child. On account of its weight version was difficult, but when extraction was performed immediately after the child was only slightly asphyxiated and very soon recovered. The subsequent condition of mother and child was very good.

The crying, which can occur only if air enters the lungs of the child, seems to be due to several factors—a very wide vagina, as in this case, passage of air between the hands of the operator while pressing on the head and pushing back the cord, and a very sensitive reflex breathing centre in the child. The prognosis for children with " Vagitus Uterinus " seems to be very good.

Torsion of an ovarian tumour in a child of six years. Heinze operated on an ovarian tumour in a child aged six years. The child had been very healthy till about a year before operation, when the mother first noted oxyuria in the stool. An acute abdominal attack occurred one morning with all the signs and symptoms of appendicitis. She was sent to hospital a few hours later with the diagnosis of appendicitis, probably in connexion with oxyuriasis.

When the peritoneum was opened a quantity of serous fluid gushed forth, and on exploring the abdomen the right ovary was found enlarged to the size of a hen's egg, cystically degenerated, and with the pedicle twisted

through 180°. The left ovary was normal. The appendix was retro-cæcal and showed signs of chronic inflammation.

The appendix, right ovary and tube were removed. The appendix contained oxyuria. Doubtless the sudden attack of pain was due to the torsion. There was no history of previous attacks.

Heinze thinks the trouble began in the alimentary tract affecting first the appendix and then the ovary. Through the cystic degeneration of the latter disturbance occurred in the follicles and then in the circulation of the pedicle, causing what Payr calls "hæmo-dynamic torsion."

The Alexander-Adams Operation. Lehrnbecker recommends the Alexander-Adams operation in cases of retroflexion as giving equally good, and sometimes better, results than an abdominal operation. He thinks it requires a less deep narcosis and there is less risk of recurrence.

J. H. FILSHILL and F. E. TAYLOR.

Monatsschrift für Gebürtshülfe und Gynäkologie.

Vol. lxvi, No. 1, *April*, 1924.

*Investigation of the respiratory exchange in pregnancy. KLAFTEN, E.

*The management of the third stage of labour, with special reference to the distension of the placenta through the umbilical vein. HEIDLER, H.

*Treatment of gonorrhœa in the female. NAUJOKS, H.

*Experimental hermaphroditism and its effect on the offspring. UNTERBERGER, F.

*Collected references on the physical and morphological condition of the blood in gynæcology. STRECKER, J.

Investigation of the respiratory exchange in pregnancy. - Klaften studied the respiratory exchange in normal pregnancy at regular intervals from the second or third month and from the seventh or eighth month; also in the puerperium. Krogh's apparatus was used and the following conditions were observed:—

(1) The patient was examined fasting, *i.e.*, 12 to 14 hours after a meal, which was poor in protein.

(2) The patient lay absolutely relaxed and at rest.

(3) Any rise of temperature that would cause an increased metabolism was excluded.

(4) The patient was made to breathe through the tube for five minutes before estimation.

(5) Two curves were taken on each of two successive days, and an average curve constructed. Under these conditions the calorie value of each litre of oxygen absorbed is 4.9 calories.

The basal metabolism rose steadily from the fourth or fifth month to a maximum just before delivery, the average rise being 16.04 per cent. These figures were then corrected for the increased activity of the mother's organs, and for the oxygen requirements of the fœtus, according to the figures of Zuntz, Bohrn and Hasselbach. The corrected basal metabolic rate corresponded with the average level for non-pregnant women of the same age, size and weight, and showed a .84 per cent. increase on Harris and Benedict's

tables. Similarly no increase was found in the puerperium and during lactation.

A slight rise was shown in a small group of cases (28.3—36.9 cc. of oxygen a minute); this fell to normal in two weeks after delivery. A considerable increase occurred during pregnancy in two cases of hyperthyroidism.

Special attention was directed to the oscillations, of which the curve is composed, each of which represents a complete respiration. These were longer during the last two months of pregnancy. The respiratory rate remained normal or was slightly decreased. Attention was drawn to this increased depth by an eclamptic case, in which the recorded depth was 4 cm.; respiration was also deepened somewhat in nephropathic cases. For these reasons Klaften believes that a greatly increased depth may indicate a toxæmia, and considers the normal increase to be due to stimulation of the respiratory centre, caused partly by the increased need of oxygen of all the organs, especially the heart and lungs, and partly and more particularly to a stimulus arising from the fœtus.

The respiratory depth returns to normal in three days after delivery, sometimes rather later in young women than in older patients.

In two cases of kyphoscoliosis there was no increase in depth, owing to the deformity of the spine, but a marked increase in rate, up to 50—54 a minute, in order to provide the necessary increase in oxygen.

The management of the third stage of labour, with special reference to the "distension" of the placenta through the umbilical vein. Distension of the placenta was first performed in 1826, and about 180 cases have now been recorded. The technique is simple and consists in dividing the cord transversely with all aseptic precautions, tying in a blunt cannula and injecting about 300 cc. of sterile physiological saline solution. The rationale of the method is that the increased surface of the placenta after injection cannot remain adherent to the uterine wall, and separation of the placenta is thus expedited where the uterine contractions had previously been insufficient. Traugott has said that the procedure is absolutely harmless and should supersede "that most dangerous operation"—manual removal of the placenta. Heidler, however, finds a mortality of only .5 per cent. for the latter, as against the 10—13 per cent. mortality of earlier series, in which cases complicated by vaginitis, sepsis, placenta prævia, etc., had been wrongly included. He stresses the importance of the strictest asepsis in removing a placenta manually, and particularly recommends the practice of drawing the cervix down to the vulva before introducing the hand.

In estimating the value of the distension method, a sharp division must be made between cases with hæmorrhage and those without. In both series Heidler believes the placenta should be removed; in cases where the placenta is retained for one hour without hæmorrhage, he considers the injection method worth trying, though he is not certain that it is directly responsible for the 27.3 per cent. of positive results. If three injections fail, Heidler proceeds to express the placenta with the fingers spread on all sides of the uterus (Crédé's original method); the next step is violent expression, which may have to be repeated under an anæsthetic, and then if the third stage has lasted three hours, manual removal is undertaken. On the other hand in cases with hæmorrhage, Heidler does not agree that distension of the placenta controls the bleeding, or has any good effect

whatever, in fact he considers it a dangerous loss of time, and it has had fatal results in two reported cases. After the injection of preparations of ergot, pituitrin, etc., and massage, he recommends compression of the aorta, followed by expression of the placenta as described above, each measure to follow the other promptly.

Treatment of gonorrhœa in the female. The seriousness of the disease lies in ascending infection of the uterus, and Naujoks believes that this may follow too early and too active treatment.

The method he advocates consists in putting the patient to bed, strictly forbidding all intercourse, and adopting general measures, such as simple diet, and regulation of the bowels. Local treatment with silver or with delegon pessaries is limited to the cervix, unless there are unmistakable signs of endometritis. Arthigon, Yatren Gonyatren, etc., have been given with good results in some cases, and recently fresh vaccines have been used, *i.e.,* vaccine prepared from any gonococcal lesion and used within four to six weeks. The vaccine is given intravenously in doses of 100 millions every five to eight days. There is a very strong reaction, with headaches, rigors, skin eruptions and rarely vomiting. If the vaccine is more than eight weeks old it produces a reaction but no curative effect.

Cases are only reported as " most probably cured " after 15—18 successive negative films, including films taken after three periods and three provocative doses of arthigon or aolan.

The vaccine treatment has been specially useful in infection of the uterus and tubes, and will be so in pregnancy, the puerperium and the vulvovaginitis of children.

Experimental hermaphroditism and its effect on the offspring. Unterberger recapitulates earlier work on the testes of the roebuck, in which destruction of the epithelial cells by X-rays or ligature of the vasa deferentia had no influence on the development of the sex characteristics. He does not think this an absolute proof of the influence of the interstitial cells, as the cells of Sertoli were uninjured. Meisenheimer has shown that early removal of the whole sex gland in the caterpillars of *Lymantria dispar* had no effect on their development. Unterberger points out that interstitial cells are absent in these testes, and suggests that the internal secretion is produced elsewhere in Arthopoda.

Unterberger used the female caterpillar of *Ocneria dispar,* extirpated one ovary and filled the space thus made with the genital apparatus of a male caterpillar. Twelve apparently female caterpillars resulted and were fertilized by normal males, all the ova produced absolutely normal male and female caterpillars. The transplanted testis, though it survived, had had no harmful influence whatever.

Steinach has proved that male and female glands antagonize each other in guinea-pigs; this was not so in butterflies. Keller and Tandler showed that in cows with twins of opposite sexes, an anastomosis in the chorion led to deformity of the female twin, due to the influence of the internal secretion of the male gland.

Nothing of this kind was seen in the butterfly experiments and the deduction was that the testis of butterflies contain only generative and no interstitial secreting tissue.

Collected references on the physical and morphological condition of the blood in gynæcology. Strecker summarizes the work done on the different properties of the blood with special reference to the diseases of women.

The *alkalinity* of the blood is reduced in cachexia, especially that due to carcinoma, in pyrexia, in toxic conditions, in inanition, eclampsia and osteomalacia. In normal pregnancy the alkalinity remains within the lower normal limit until just before labour, when there is a fall of 8 per cent., which is over-compensated as a rule after delivery. Strecker believes this acidosis may be the cause of the onset of labour, since irritability of the nervous system has often been found in acidosis.

Coagulation of the blood. A long list of factors influencing the time taken by clotting is given, of which the more important include hæmorrhage, eclampsia, administration of calcium and protein injection, which cause shortening of the time, and anaphylaxis, the hæmorrhagic diathesis, lesions of the liver, and intracranial injuries of the new-born, which cause a lengthened interval. Contradictory results have been obtained in the clotting of blood shed from the uterus, though it has been definitely shown that the menstrual blood does not clot, owing to an antagonizing agent which has been extracted from the uterus, the ovaries, the corpora lutea, and the menstrual fluid. Rapid clotting has been found in pregnancy, followed by slowing in the puerperium. The work of F. Jervell suggests some alteration in the uterus of the blood shed post partum, as this did not clot, whereas blood taken simultaneously from the ear clotted readily.

The *hæmoglobin content* has been studied during menstruation and pregnancy with differing results. There seems to be a regular monthly cycle in individual women rather than a general condition. During labour destruction and active regeneration of red cells take place.

The cells of the blood. The erythrocytes are affected in gynæcology only by malignant tumours, and occasionally perhaps by sepsis. After dealing with the physiological leucocytosis, including that occurring in pregnancy, Strecker refers to pathological leucocytoses of post-hæmorrhagic, toxic or inflammatory type. In connexion with the latter he emphasizes the importance of regarding it as a reaction on the part of the marrow, and refers to the lymphocytosis and eosinophilia, which follow the polymorphonuclear leucocytosis in favourable cases. Of pelvic conditions, chronic encapsulated suppuration has no effect on the leucocytes; hæmatocele and torsion of a pedunculated tumour show post-hæmorrhagic leucocytosis; puerperal fever has a moderate leucocytosis of prognostic significance.

The eosinophiles are reduced at the climacteric, after double ovariectomy, and in hypoplasia of the genital tract, possibly because of an increased production of adrenalin. They decrease during pregnancy and often disappear during labour, to reappear in increased numbers in the puerperium. Gonorrhœa shows high values especially in ascending puerperal infection with involvement of the adnexa. The eosinophiles vary in malignant disease; they are increased in neoplasia of the breast, thyroid or ovaries, a fact which is probably due to disturbances of internal secretion. They are decreased in acute febrile infections.

The thrombocytes resemble the leucocytes in their numerical variations and in carrying various antibodies. They are involved in the questions of coagulation and viscosity, and are the principal carriers of thrombogen. A decrease in the number of platelets precedes a rise of temperature; shock can cause their complete disappearance from the blood, as they agglutinate

and adhere to the capillaries, and a similar condition has been found in fainting attacks. Menstruation causes a decrease with a minimum on the second day, a cycle in which the spleen is probably involved.

The *viscosity* of the blood depends on a number of factors, and is generally decreased during the day to rise again in the evening. In acute suppuration with marked leucocytosis the viscosity rises, and this may be important in the differential diagnosis of tubal gestation (decrease) and adnexitis (increase). The viscosity is reduced in pregnancy and labour, and raised in eclampsia. It is parallel to the rapidity of sedimentation of the corpuscles. Fahraeus found this rate constantly raised in pregnancy, but it also occurred in all febrile and inflammatory processes. Linzenmeier estimates the rate by filling special small tubes with a mixture of .2 cc. 5 per cent. sodium citrate solution, and .8 cc. blood, inverting twice and the time taken by the corpuscles to sink to a standard mark. In men this time is 10 hours, in women five to six hours, in pregnancy two hours, in menstruation three to five hours, in umbilical blood one and a half to two days. All metabolic processes affect the sedimentation rate. Syphilis and tuberculin injections cause an increased rate, as also malignant disease, especially after X-ray or radium treatment.

The sedimentation rate is useful in inflammation of the adnexa in determining the most favourable time for operation; a slow rate excludes a fresh or subacute process, and gives a better prognosis. The rise or fall in the rate indicates sedative or absorbent measures. A rate of one hour means a doubtful freedom from infection, while with a rate of under half an hour virulent bacteria are still present, and peritonitis may follow operation. Many theories have been brought forward to solve the problem of the sedimentation of the corpuscles, but much work remains to be done.

DOROTHY N. L. LEVERKUS.

Münchener Medizinische Wochenschrift.

No. 33, *August* 17, 1923.

*Clavipurin : a new natural preparation of ergot. HOFFMANN, K.

No. 34/35, *August* 31, 1923.

Infectivity of tuberculosis in sucklings. BRATUSCH-MERRAIN, A.

Bleeding after delivery : a reply to Becker-Alzey. OPITZ, E.

No. 36, *September* 7, 1923.

*Is retro-placental blood suitable for the sero-diagnosis of syphilis? HOHN, J., and GUMMERT, L.

Duties of contract obstetricians. ZANGEMEISTER, W.

No. 37, *September* 14, 1923.

*Epilepsy and menstruation. WINTER, F.

The weakly new-born and medical practice. SCHŒDEL, J.

No. 38, *September* 28, 1923.

Treatment of placenta prævia. OPITZ, E.

No. 40, *October* 5, 1923.

The sedimentation of erythrocytes and its practical significance. LINZENMEIER, G.

*The conservative treatment of abortion. LOVRICH, J.

No. 41, *October* 12, 1923.

*The surgical treatment of puerperal fever. VARELA, E.

No. 42, *October* 19, 1923.

On the causes of the results of radiation treatment of uterine cancer. OPITZ, E.

No. 43, *October* 26, 1923.

Prolapse of umbilical cord. HALTER, G.

Clavipurin. Under the name Clavipurin (derived from *Claviceps purpurea*) Hoffmann describes a new natural product of ergot, produced by the extraction of ergot with 0.1 per cent. tartaric acid. It is said to comprise a constant mixture of active alkaloidal sekale bases, free from the proteinogenous amines tyramine and histamine. Clinical and experimental proofs of its action on the uterus are given, and no harmful effects have been observed—even on intravenous injection.

Is retro-placental blood suitable for the sero diagnosis of syphilis? Hohn and Gummert examined the retro-placental blood in 944 cases. After delivery of the placenta the uterus was compressed and the blood was received in sterile tubes. The precipitation reactions gave fewer false positive results than did complement fixation. The addition of small quantities of glycocoll and other reagents which inhibit complement fixation did not produce false results with precipitation tests.

Epilepsy and menstruation. Winter describes four cases of genuine epilepsy occurring in association with menstruation in girls from 17 to 21 years of age. In three the epileptic attacks commenced with the onset of puberty : in the remaining case the epilepsy commenced four years previous to the onset of menstruation. Temporary castration by Röntgen rays benefitted all four cases. Winter believes that in these cases there was a casual connexion between menstruation and the epileptic attacks. He also leans to the newer theory that epilepsy is not a true brain disease, but is due to an endocrine disturbance.

The conservative treatment of abortion. In incomplete abortions Lovrich gives 1 gm. of quinine with an equal amount of diethylmalomylurea in five divided doses in one day. When the pains start, three or four intravenous injections of pituitary extract are given at intervals of 10 to 15 minutes. He adopted this treatment in 324 spontaneous abortions with a mortality of less than one per cent., and in 120 induced abortions (induced by puncturing the ovum) with no death. Neither quinine nor pituitary extract should be given in uninterrupted pregnancy.

The surgical treatment of puerperal fever. According to Varela swabbing the uterus with gauze soaked in idodine as often as necessary followed by intermittent irrigation with Dakin's solution forms the basis of the surgical treatment of puerperal fever. F. E. T.

The following abstracts are reprinted from "MEDICAL SCIENCE : ABSTRACTS AND REVIEWS," by kind permission of the Medical Research Council :—

Hyperplasia of the uterine muscle-fibres of rabbits during heat. ANDREI, O. *Pathologica*, 1923, 15, 229. Abstracted from " Medical Science : Abstracts and Reviews," 1924, ix, 5, 417.

A considerable number of mitotic cell-divisions can be observed in the muscular wall of the uterus of rabbits during heat. The phenomenon appears to be due to substances contained in the blood during that period; in fact it can be experimentally reproduced in normal rabbits, and even in those which have not reached full sexual maturity, by inoculating them with citrated blood from rabbits in the heat period. C. DA FANO.

Further observations on the antigenic effects of semen. Mechanism of sterilization of female rat from injections of spermatozoa. MCCARTNEY, J. L. *Am. J. Physiol.*, 1923, 66, 404. Abstracted from " Medical Science : Abstracts and Reviews," ix, 5, 421.

Further experiments to demonstrate that temporary sterility can be induced in female rats by the injection of semen and even by the introduction of spermatozoa into the vagina. The sterility lasts from 2 to 27 weeks, and seems to be due to the presence of antibodies for spermatozoa in the blood serum and in the vaginal secretion. The œstrous cycle is not affected by this immunization. In male rats vaso-ligation may be followed by the development of antibodies for spermatozoa in the blood serum. The clinical application of this phenomenon to the human subject is briefly referred to.
W. CRAMER.

Persistence of the neuro-vaccine in the testicle, ovary and lungs of immunized animals. LEVADITI, C., and NICOLAU, S. *Compt. rend. Acad. d. Sc.*, 1923, 177, 466. Abstracted from " Medical Science : Abstracts and Reviews," 1924, 5, 431.

A short note on the recovery of neuro-vaccine in the testicle, ovary and lungs of rabbits which have received an intravenous or intradermal inoculation of the virus 11 to 21 days previously. The other organs of the body, and especially tissues of mesodermic origin, were free from the virus.
J. R. PERDREAU.

The acid-base balance in the plasma in the later stages of pregnancy. MARRACK, J., and BOONE, W. B. *Brit. Jl. Exper. Pathol.*, 1923, 4, 5, 261-5. Abstracted from " Medical Science : Abstracts and Reviews," 1924, ix, 6, 455.

In the majority of pregnant women the reaction of the blood was found to be more alkaline than in controls, and the plasma bicarbonate was not less than would be found in the plasma of controls separated at the same *pH*. It is concluded that the reduction of plasma bicarbonate was the result of reduction of CO_2 tension of hyperpnœa.

The sodium in the plasma was found rather less than on the average in pregnant women than in controls. There was no evidence of accumulation of abnormal acids in the blood. AUTHORS.

REPORTS OF SOCIETIES.

ROYAL SOCIETY OF MEDICINE.

Meeting held March 6th, 1924.

Joint Discussion

on "Birth injuries with special reference to intra-cranial injuries with hæmorrhage, and to nerve injuries," by the following sections: Study of Disease in Children, Neurology, Obstetrics and Gynæcology, and Orthopædics.

Mr. Eardley Holland (Obstetrics and Gynæcology): Many recent investigations in fœtal and neonatal pathology have revealed the fact that intracranial injury and hæmorrhage is the commonest cause of still-birth and of death of the infant during the first few days of life. This disturbing knowledge does not seem yet to have penetrated very far beyond the obstetricians and child-pathologists who have been primarily responsible for the investigations, and intracranial trauma has not yet been given its due prominence in human pathology. The modes of origin, sites and extent of intracranial injury and hæmorrhage, and the effects on the fœtus and newly-born child are now known with precision. It is otherwise with the remoter effects on those children who survive their injury or hæmorrhage; for the condition is by no means always fatal and much controversy is waged in the camps of the pediatricians and neurologists about the effects in later life. This is the aspect of the subject that truly merits discussion.

All intracranial hæmorrhage is not traumatic or mechanical in origin. Ætiologically, intracranial hæmorrhage may be divided into (1) traumatic or mechanical, (2) asphyxial. Figures are quoted from recent researches to show the great frequency with which hæmorrhage is found in still-born fœtuses and neonates, and the usual sites and extent of the hæmorrhage are described. The traumatic variety of hæmorrhage is then considered in some detail, and some aspects of cranial mechanics in the fœtus are demonstrated in so far as they bear on the origin of intracranial injury and hæmorrhage. Under the stress of labour the plastic fœtal head undergoes a change in shape or moulding, which, if excessive, results in the stretching and tearing of the dura mater septa and of certain cerebral blood vessels. Figures are quoted to show the frequency with which tears of the tentorium cerebelli are found in association with hæmorrhage. The chief source of traumatic hæmorrhage is the vein of Galen or its tributaries. The obstetrical conditions which determine traumatic hæmorrhage are those which cause too great or too rapid head moulding, and amongst the latter breech-labour deserves pride of place.

The mode of origin of asphyxial hæmorrhage is next discussed. It is difficult to assess the relative frequency of the traumatic and the asphyxial types, for they are often combined; but there is very little doubt that the traumatic is much the commoner and more important variety.

Dr. CAMERON (STUDY OF DISEASE IN CHILDREN) proposed to discuss the question from the clinical standpoint under three headings: (1) The symptomatology of subdural hæmatoma in the newly-born. (2) The survival of certain infants who have suffered in this way and the long latent period which ensues before the evidence of damage to the cortex is appreciable. (3) The ultimate effect upon the physique and intelligence of the child.

(1) Not all the infants have been born after a difficult labour or after a precipitate labour. In a considerable number the symptoms have supervened upon a labour in no way abnormal. In almost all the bulging fontanelle has given evidence of increased intracranial tension. Examination of the cerebro-spinal fluid in a high proportion of cases has shown it to be under high tension and bloodstained. If the examination is made after some interval the blood may be altered as shown by crenation of the corpuscles or the brown staining of met-hæmoglobin. The ophthalmoscope in almost half the cases is said to show punctuate hæmorrhages, more rarely œdema of the disc. An increased rigidity and spasticity of limbs, often with opisthotonos and trismus, is common, and there are usually either generalized convulsions or localized twitchings especially of the face and eye muscles. Light percussion upon the sternum, for example, will often produce a characteristic jerking together of all four limbs. Somnolence or actual coma may be a striking symptom, or there may be persistent crying and restlessness with all the appearances of pain. The pulse is often slowed. Some interference with the respiratory rhythm is the rule. There may be asphyxia, pallida or livida, at the moment of birth, and even after respiration is established it may remain shallow, halting, slow or rapid, and apt to cease altogether. The suction reflex is often absent.

(2) It is clear that the life of infants who show such symptoms in severe degree is very precarious. I have in my own small experience seen eight cases in which I thought that a subdural hæmatoma was present, and all were fatal. That in cases of lesser severity the condition is compatible with life seems to me certain, though I am aware that the view that all die has been put forward. So long as our powers of diagnosis only enable us to recognize the severest grade, so long the doubt must exist. The routine use of lumbar puncture and of the ophthalmoscope in the new-born and a careful clinical examination will probably bring to light many less severe cases.

If recovery takes place a further difficulty is presented by the long latent period which then ensues. The cortex of the normal infant only gradually awakens to activity. Only those parts of the brain which are active from the first are medullated, as, for instance, the nervous paths for respiration, suction, cardiac action, crying, etc. The pyramidal tracts only gradually become medullated during the first year, and delay in the transition from the spastic uncontrolled movements characteristic of the new-born to that degree of voluntary control of lips, tongue, hands and feet which the normal infant achieves may not be obvious to the parents until the failures to walk or grow at a year or more proclaims it.

(3) The infant whose cortex has been damaged lags far behind the normal in development upon the sensori-motor side. The spastic limbs can neither be moved at will, nor can they sense and feel objects. Since a great part of infantile education proceeds along sensori-motor paths, the initial delay in development is always in these cases much greater than the ultimate

loss. Very many learn very quickly by eye and by ear, and from the first the mother may be conscious of the retentive memory. When at length the stiff limbs pass in some degree under control, in later childhood improvement may be rapid. In general the children have the power of concentration and persistence and achieve remarkable precision considering the inco-ordination in some few much practized movements. The general character may be on a high plane. They may be affectionate and truthful, as they may possess considerable forms of imagination and artistic sense. Children of this type are not likely to be inmates of homes for mentally defective children. Few of my own patients have consulted a neurologist; nearly all have been treated orthopædically. It is by the name of the founder of the Orthopædic Hospital that we know them. In their homes there is often no doubt about their cleverness, though they may be shy and awkward and self-conscious with strangers. Their childhood is so highly abnormal that they are passionate and ill-controlled or nervous and unstable. Little comments more than once on the strange resemblance in character and temperament that exists between many of these individuals. In all these ways they form a group apart, which, at least in its most characteristic representatives, seems clearly separated from cases of spastic idiocy due to a developmental deficiency of cortical neurones. That Little was right in contending that the cause was to be found in cortical hæmorrhage at birth I believe strongly, although this condition may not be the only or invariable result of such an accident.

Dr. James Collier (Neurology) very briefly reviewed the history of the connexion of birth injuries with infantile spastic paralysis and argued that only in the rarest cases are these conditions associated. He pointed out the common occurrence of varying degrees of subarachnoid hæmorrhage in the infant during the process of birth and argued that minor degrees of such hæmorrhage are unassociated with any detriment to the child, while major degrees have an especial symptomatology. He criticised the opinion that asphyxia neonatorum is dependent upon meningeal hæmorrhage. He made some remarks upon conditions of fracture-dislocation of the spine, Erb's paralysis, Klumpke's paralysis and facial paralysis which have come under his observation.

Mr. H. A. T. Fairbank (Orthopædics) confined his remarks to birth-palsy. Much commoner after head presentation than after breech. Difficult labour as a rule. Traction on plexus leading to partial or complete tearing of one or more nerves is the theory favoured. So-called upper arm type by far the most common. More or less complete recovery as a rule. Very rarely is operation on the nerves called for. Obvious signs of recovery usually present in three months if treated properly. Some show marked shortening of limb as a late result. Support of limb with humerus horizontal and forearm vertical and supinated essential. Great tendency to contracture in most cases. Operation if no recovery in three to six months. Secondary suture or excision of scarred portion and suture the only procedures of any use.

Posterior subluxation of shoulder is secondary to the paralysis and is almost inevitable if case untreated. If paralysis persists subluxation does not occur. In most cases subluxation requires operative treatment. Division of subscapularis alone is not sufficient except occasionally in youngest cases. Division of anterior part of capsule also necessary. Fixation in

abduction for three weeks followed by abduction splint removed daily for massage and manipulation. Dislocation of head of radius as complication.

Dr. THOMAS LUMSDEN, Dr. STRACHAN, Dr. BERNARD MYERS, Mr. AITKEN, and Mr. BANISTER also spoke.

THE ROYAL SOCIETY OF MEDICINE.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

Meeting of the Section held May 1, Mr. T. G. STEVENS, Vice-President, in the chair.

The officers for the ensuing year, nominated by the Council, were elected, and votes of thanks to the retiring officers of the Section were carried.

Prof. LOUISE MCILROY and Miss D. L. LEVERKUS read a short communication on the

ALTERATIONS IN THE POSITION OF THE FŒTUS DURING THE LAST WEEKS OF PREGNANCY.

Statistics were produced from a large series of cases showing the percentage of breech presentations at various periods of pregnancy. A very large proportion of these breech presentations became altered to cephalic presentations by the thirty-sixth week. This proportion is so high that the authors do not consider it necessary to perform version as a rule before the thirty-sixth week. Radiograms of the fœtus *in utero* were also shown.

This was discussed by the PRESIDENT, Dr. FAIRBAIRN, Dr. GIBBONS, Mr. LACK, Dr. EARDLEY HOLLAND, and Mr. BOURNE.

Dr. GEORGE GRAHAM read a short communication on

THE EFFECT OF PREGNANCY ON A PATIENT WITH RENAL GLYCOSURIA.

In this case the patient had been under observation since 1911, when she was eight years old, and blood and urine analysis indicated that the case was one where the threshold of the kidney for sugar was lower than usual. She recently became pregnant and was delivered of a normal, healthy baby without complications.

Dr. GRAHAM introduced also a case of

DIABETES MELLITUS COMPLICATED BY PREGNANCY,

treated with insulin. This patient suddenly developed diabetes in 1922 and treatment was commenced. In 1923 she became pregnant. Treatment with insulin was continued and, although the diabetes seemed to be adversely influenced by the pregnancy, she went to term and was delivered of a normal and healthy baby without any complications.

This was discussed by the PRESIDENT, Mr. BOURNE, Mr. LUKER, and Dr EARDLEY HOLLAND.

Mr. ALEXANDER GALLETLY read a paper on a case of

PRESACRAL TERATOMA COMPLICATING LABOUR.

This patient had a Cæsarean hysterectomy performed owing to the presence of a large cystic tumour in the pelvis and in the buttock. A month later the abdomen was re-opened and, after ligature of one internal

iliac artery, the cystic mass was freed as deeply as possible. The patient was then put in the lithotomy position and a large incision made from the perineum to the buttock. The tumour passed through the sacro-sciatic notch. It was removed from below, the abdomen (which had been temporarily closed) was re-opened and the peritoneum united across the pelvic floor. The patient made an uninterrupted recovery.

Sections of the tumour showed it to be of a teratomatous nature. Mr. Galletly discussed in detail the possible modes of origin of such a tumour in this position, and collected the recorded cases from the literature.

This was discussed by Mr. BONNEY and Mr. PALMER.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

A Meeting of the North of England Obstetrical and Gynæcological Society was held in Sheffield on November 16th, with Professor M. H. PHILLIPS in the chair, when Dr. HERD (Liverpool) described two cases of

ENCEPHALITIS LETHARGICA ASSOCIATED WITH PREGNANCY.

The first case was a primigravida, aged 24, who had no history of previous illness. The pregnancy was normal up to the thirty-sixth week. The patient then had headaches, albuminuria, and slight œdema of the ankles. She had treatment and showed signs of temporary improvement. A week later she had severe headaches, and a fit. When she was admitted to hospital her blood pressure equalled 130 mm. Hg., and she had albuminuria—9 grams of albumin per litre. There were no uterine contractions. The patient had six fits in six hours following admission—apparently typical eclamptic fits. Next day a living child was delivered. Later in the day rhythmic clonic contractions of the jaw muscles began. The temperature was slightly raised. The patient was restless and confused, and at the end of five days, as she was becoming worse, she was transferred to another hospital, where she died on the twentieth day after delivery. She had nystagmus, ptosis of the upper eyelid, and weakness of the facial muscles. On post-mortem examination the diagnosis of encephalitis lethargica was corroborated, and no evidence of toxæmia was found.

The second case was a primigravida aged 28, who had been healthy up to the thirty-fifth week of pregnancy. On admission to hospital she was restless and excited; she had inco-ordinated clonic movements of the head and limbs present during sleep. Her reflexes were normal. Albuminuria amounted to 2 grams per litre. Chorea gravidarum was diagnosed and she was treated with parathyroid extract, calcium lactate and sedatives. On the fourth day after admission the patient was delivered of a stillborn child. The temperature rose to between 100° and 102° F. Diplopia was noticed on the following day. She had delusions, restlessness, and as she became worse she was transferred to another hospital. A diagnosis of myoclonic lethargic encephalitis was made. The patient was slowly recovering—four months later—but complete recovery was not expected.

Dr. J. CHISHOLM (Sheffield) recalled a case in a 2-para, with marked clonic movements of the abdominal walls and symptoms of internal obstruction. Cæsarean section was performed; no obstruction was found and the movements continued afterwards. The patient was dull and

apathetic. She recovered, but the child also had lethargic encephalitis. Dr. Chisholm mentioned another case with five and a half months pregnancy diagnosed at first as pernicious vomiting. Though labour was induced the patient died. She had nystagmus in addition to the other symptoms.

Supravaginal hysterectomy and panhysterectomy.

Dr. Fletcher Shaw (Manchester) read a paper on the advantages and disadvantages of supravaginal hysterectomy and panhysterectomy. He said that some gynæcologists believed that panhysterectomy should be done whenever the uterus had to be removed, while others believed that supravaginal hysterectomy was the better operation for many cases, though they would probably always do panhysterectomy if the cervix was badly lacerated. In a period of eighteen months he had had three patients in whom carcinoma of the cervix occurred after supravaginal hysterectomy, and his object in bringing the subject before the society was to see if other gynæcologists had had any similar cases. Although those three cases were seen in a period of eighteen months, they were the only ones he had ever had, and, so far as he knew, none of his colleagues at St. Mary's Hospital had had a single case; the occurrence after supravaginal hysterectomy was therefore very rare and it was probably merely a coincidence that he should get these three in so short a period. If that proved to be the case he still thought that there was a distinct use for supravaginal hysterectomy, as it was a much quicker operation and caused less shock to the patient and, moreover, did not entail opening the vagina, which, no matter how carefully cleaned, was potentially a septic passage. In a consecutive series of cases of supravaginal hysterectomy and panhysterectomy he found the mortality higher after panhysterectomy, and in the investigation of the convalescence of a consecutive series of both types the patients after supravaginal hysterectomy had, on the whole, a smoother time than those in whom the complete operation had been done. He still thought supravaginal hysterectomy was useful in nulliparous women, but panhysterectomy should always be done where the cervix was badly lacerated or in any way diseased.

The President said that he did not remember seeing carcinoma of the cervix after subtotal hysterectomy, but he had removed cervices for discharge. He believed that panhysterectomy was the better operation in all cases.

Cases and specimens.

Dr. W. W. King (Sheffield) showed a specimen of carcinoma of the cervix which he had removed. The patient had had subtotal hysterectomy in 1919 for fibroids. In 1923 she had bleeding for three months, and the cervix was found to be carcinomatous. He recalled another case in a nullipara who in 1911 had gonorrhœa. In 1918 the patient had a pelvic abscess drained; in 1920 she had subtotal hysterectomy for bleeding, and six to eight months later she had ineradicable carcinoma of the cervix. He believed in total hysterectomy in multiparæ, and subtotal in nulliparæ.

Dr. Bride said that in a case of a nullipara he had done a panhysterectomy and found an early carcinoma of the cervix.

Dr. Chisholm mentioned a patient who had had a subtotal hysterectomy twenty-five years ago and who had bleeding for two months and was found to have ineradicable carcinoma. She had had one child and one miscarriage.

Dr. Clifford said that he did not remember a case of carcinoma of the

cervix occurring in his practice after subtotal hysterectomy. He said that it was so rare that it hardly affected the difference in the mortality rate between the operations of subtotal hysterectomy and panhysterectomy.

Dr. J. BRIDE showed a tumour simulating complete ulcerated prolapsus uteri. He removed it from a 2-para who was pregnant for four months. It was situated in the interval between the right labium majus and minus, and resembled an ulcerated complete prolapse. It had been noticed for twelve months and was steadily getting bigger. It was removed without affecting the pregnancy. Microscopically it was a fibroma.

Professor M. H. PHILLIPS showed (1) an adenomyoma of a rudimentary uterine cornu, and (2) salpingo-cæcal fistula.

(1) The specimen was removed from a 7-para aged 44, who had had menstrual pain for the last seven years and recently pain not associated with menstruation. A swelling the size of a golf ball was attached to the left side of the supravaginal cervix and was diagnosed as adenomyoma of Gartner's duct. At operation the swelling was found to be a rudimentary left cornu of the uterus attached to the supravaginal cervix, and also to the pelvic wall. On section of the cornu it was found to contain spaces filled with dark blood, lined by columnar or cubical epithelium, embedded in a cytogenous mantle similar to uterine endometrium.

(2) The specimen was removed from a 3-para, aged 32 years. Last child was born three years ago, and this was followed by severe abdominal pain for two weeks. She was admitted into hospital in November, 1922, suffering from a subacute attack of bilateral salpingo-oöphoritis. Five weeks later she was seen again, when she had a fixed tender swelling to the right of the uterus which was thought to contain pus. Four weeks afterwards the swelling had disappeared and the patient felt much better. She was admitted in August, 1923, for dysmenorrhœa and backache. On examination a retroverted adherent uterus and slight enlargement of the appendages were found. The right tube was firmly fixd to the cæcum, and the thickened area of the cæcum was removed with the tube. The end of the tube was found prolapsed into the cavity of the cæcum, the ostium being patent and well away from the opening of the vermiform appendix. The condition was thought to be the result of rupture of the peritubal pyocele into the cæcum.

Dr. BRIDE recalled a similar case in which an ectopic pregnancy had ruptured into the cæcum. Professor M. H. PHILLIPS said that originally this case had been diagnosed as an ectopic pregnancy by the house-surgeon, but it had not occurred to him.

Dr. J. BRIDE gave the history of two consecutive pregnancies with central placenta prævia and Cæsarean section.

A 2-para, aged 34, was seen on November 20th, 1922, when she was found to be three months pregnant; she had a history of Cæsarean section by Dr. Fothergill, whom he had assisted. A living child was delivered, who was still alive and healthy. On April 21st, 1923, the patient was admitted into hospital eight and a half months pregnant, with severe bleeding with central placenta prævia. Dr. Bride decided to perform Cæsarean section; a living child was delivered, and at the same time the woman was sterilized by removing portions of both Fallopian tubes. The child died of convulsions on the eleventh day. Nothing was found to account for the placenta prævia habit.

Dr. STACEY said that it was very rare to have recurring central placenta prævia.

Dr. W. W. KING asked to what extent the cervix was dilated; he criticized the second Cæsarean section, and also the sterilization of the patient.

Dr. FLETCHER SHAW said that one did not expect a Cæsarean scar to stand difficult deliveries in future pregnancies.

Dr. BRIDE said that the cervix was only slightly dilated; he did not consider possible rupture of the old scar. At operation the old scar could hardly be seen.

Dr. CLIFFORD (Manchester) related a case of full-time ectopic gestation. A married woman was admitted to hospital on November 30th, 1922; she had had amenorrhœa since February, 1922. Fœtal movements had shown that the child was active until two days before admission. She appeared to be at full term, the fœtal limbs were rather prominent, the head high up and in the R.O.P. position. No fœtal heart sounds were heard, nor any movement felt. The cervix was protruding from the vagina; the presenting part could not be definitely felt. A radiogram gave no assistance; the temperature was slightly raised; the cervix was cleansed and replaced and supported by a ring pessary. Labour did not come on and the patient was discharged at her own request on January 5th, 1923. She was readmitted on January 26th when the fœtus was in the same position, and the temperature was slightly higher. Bougies were inserted into the cervix, but could only be pushed for $3\frac{1}{2}$ inches. This was done twice. Her temperature was 102° F. and pulse rate 120. On January 29th and February 4th the patient had four minim doses of Dr. Jenkins's stock residual vaccine. On February 14th Dr. Clifford opened the abdomen and found a full-term macerated fœtus lying in a sac with the placenta almost entirely attached to the outer abdominal wall. This was stripped off without bleeding; the membranes were not removed, and the cavity was drained and irrigated by the Carrel-Dakin method for three weeks.

The cavity rapidly became smaller, and six weeks after operation there was a sinus $1\frac{1}{2}$ inches long. Inquiries afterwards revealed the fact that in March, 1922, the patient had severe abdominal pain with vomiting, followed a little later by hæmorrhage lasting five days. Afterwards she suffered considerable abdominal pain, and in May consulted a surgeon, who thought she had had appendicitis. Dr. Clifford considered that the condition was very difficult to diagnose.